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VS

System Administrator's Reference

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PREFACE

This document is intended as a guide for system administrators. It describes all the functions specifically reserved for use by the system administrator.

This manual is organized in the following way:

- Chapter 1 describes the Stand-Alone Utility System, which includes the COLDSTART and CIP (Compress-In-Place) utilities.

- Chapter 2 describes the Security System, which includes the SECURITY utility and the PROTECT command.

- Chapter 3 explains the Release 6.20 System Generation (SYSGEN) procedure, including the use of the GENEDIT utility to create configuration files.

- Appendix A lists the Input/Output Processors and supported devices for the VS80/60/50, VS100/90/85, and VS25/45.

- Appendix B lists GENEDIT error messages and resolutions.

- Appendix C lists the diagnostic error codes for the VS25/45.

For information concerning Release 6.20 of the operating system, refer to the VS Release 6.20 Software Bulletin (800-3114).

Other manuals that contain information of interest to the system administrator include:

- VS Procedure Language Reference (800-1205)
  Describes the syntax of the VS Procedure language and the use of the Procedure Interpreter.

- VS Programmer's Introduction (800-1101)
  Describes the VS Command Processor and the use of all basic system functions.

- VS System Operator's Reference (800-1102)
  Describes VS system operation functions, including power-up/power-down, Initial Program Load (IPL), Control Mode Dump, and Backup procedures.

- VS System Utilities Reference (800-1303)
  Describes the use of VS System Utilities (e.g., COPY, DISPLAY, IBMCOPY).

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CHAPTER 1
THE STAND-ALONE UTILITY SYSTEM

1.1 INTRODUCTION

The Stand-Alone Utility System for single-disk systems allows you to perform operations on the system disk that are not available under normal VS operating system control. The following utilities are available as options of the Stand-Alone Utility System:

- COLDSTART -- Used to operate a VS system without a standard system disk or operating system.

- CIP (Compress-In-Place) -- Used to consolidate free extents on the system disk without the need to do a full volume backup and restore.

1.1.1 COLDSTART Utility

The COLDSTART utility allows you to operate a VS system without a standard system disk or operating system. Its main purpose is to enable you to bring up a new machine by formatting the system disk and copying a minimum system to it. Primarily designed for use on a VS25 or VS45, COLDSTART can be used on any VS system.

COLDSTART has two modes of operation: the Copy mode and the Backup mode.

Copy Mode

The Copy mode of COLDSTART offers the following ways to copy data from the input diskette(s) to the system volume:

- Initialize the system volume before copying the data.

- Reformat the system volume before copying the data.

- Copy only those files you want to add or with which you want to update your system volume.

The method you choose depends on your circumstances. If you are bringing up a new system, it is likely that the disk you are using for the system volume has not been initialized. Because a disk must be initialized before you can use it, you would choose the first option.

The second option, reformatting, can be used to bring up a system when the system volume has already been initialized. Reformatting clears the volume of existing data and rewrites the Volume Table of Contents (VTOC). This option is required, if your system volume is not media-tolerant, to protect the VTOC in case the disk fails.

The third option, copy only, allows you to load new system files without rebuilding the entire system. COLDSTART checks for duplicate file names, flags each one, and allows you to skip the input file or to rename either the old or the new file.

Backup Mode

The Backup mode of COLDSTART is useful on single-disk systems when you can read but not perform an Initial Program Load (IPL) from the system disk. By running the Backup mode prior to reformatting, you can preserve any undamaged data resident on the volume.

NOTE

The COLDSTART Backup mode may not work on a disk with hard I/O errors or a bad VTOC.

1.1.2 Compress-In-Place (CIP) Utility

The Compress-In-Place (CIP) utility consolidates free extents on the system disk without the need to do a full volume backup and restore. It provides useful free space and improves performance by reducing disk seek time. An on-line version of CIP is available for nonsystem disks (see the VS System Utilities Reference).

1.2 ENVIRONMENT

The stand-alone utilities, COLDSTART and CIP, are completely self-contained, stand-alone programs. They do not contain any supervisory calls (SVCs). All I/O and screen access routines used are embedded in the programs. They do not use the normal operating system, nor can the normal operating system use them. You load COLDSTART and CIP by IPLing from a specially formatted diskette.

1.3   PROCEDURES FOR LOADING THE STAND-ALONE UTILITIES

This section describes the steps required to load the stand-alone utilities. These procedures, as well as those described in Section 1.4, are necessary to bring up a new VS25 or VS45. Although the procedures are written for these specific models, they are applicable to any VS system. Special COLDSTART instructions for other VS systems are detailed in Section 1.6. These procedures assume that you are using the diskette drive as the input device and the internal, fixed drive (located inside the cabinet) as the output device.

1.3.1   Preparing the Machine

Follow the procedure below to prepare your system for loading the stand-alone utilities:

1. Power up Workstation #0, the operator's console.

2. Set the BOOTSTRAP MEDIA switch on the upper front panel to the top position. This setting selects the diskette drive as the input device.

3. Turn the key on the upper front panel to Local. Power up the Central Processor (CP) with the CP ON/OFF switch located in the lower left corner of the lower front panel. Press the red DC POWER button located next to the CP ON/OFF switch. Wait one minute for the internal fixed disk to reach speed.

1.3.2   Loading COLDSTART and CIP

The IPL diskette used to load COLDSTART and CIP is called FORMAT. Insert it into the diskette slot, close the door, and press the IPL button. Diagnostic tests resident on the diskette are automatically run. The progress of the diagnostics is displayed at your workstation. The Error Code LED panel counts down from FFFF to 0000 (in hexadecimal notation) to test that the LED is working. The panel then counts up through a series of diagnostic routines (typically 10, 12, 14, and 40), and finally shows a blank display. If the panel displays a number for more than 15 seconds, the system has failed one of the diagnostic routines.

The IPL Drive Selection screen is displayed at the workstation. Position the cursor next to the diskette drive entry and press ENTER. When the diagnostics are completed (about 30 seconds), the system microcode and the COLDSTART and CIP programs are loaded into main memory.

1.3.3 Stand-Alone Utility Selection Screen

The Stand-Alone Utility Selection screen, shown in Figure 1-1, is the first screen you see after loading COLDSTART and CIP.

Press PF2 to initiate the COLDSTART utility. Running COLDSTART is described in Section 1.4.

Press PF3 to initiate the CIP utility. Running CIP is described in Section 1.5.

```
            *** Wang VS Stand-Alone Utility System ***


    The Stand-Alone Utility System allows users of single-disk systems
    to perform operations on their system disks that are not available
    under normal VS operating system control.



 Please select the desired function by pressing the appropriate PF key:

     (2) COLDSTART  - Used for formatting, copying to, or backing up
                      the system disk.

     (3) CIP        - Used to consolidate free extents on the volume
                      without the need to do a full volume backup and
                      restore.
```

Figure 1-1. Stand-Alone Utility Selection Screen

1.4 RUNNING COLDSTART

The COLDSTART System Disk Specification screen, shown in Figure 1-2, requests the device type and device address for the output volume (the volume to which you are copying the system software or from which you are backing up). For this example, the output device is the fixed disk located inside the cabinet of the VS25 or VS45. Refer to the table at the bottom of this screen for a list of device types and descriptions. The device type for this drive is Q2040. Its physical address is 2400. The address of the second fixed drive is 2401, and removable disks are at addresses 3400 through 3403.

```
                         *** Wang VS Coldstart ***




           Please specify the system disk and press ENTER.

                  Device Type                  - ********
                  Physical Device Address (Hex) - ****

           Device Type  Description            Device Type  Description
           2265V-1      75 Meg Rem Disk        2265V-2      288 Meg Rem Disk
           2280V1F      30 Meg F/R Disk (F)     2280V1R     30 Meg F/R Disk (R)
           2280V2F      60 Meg F/R Disk (F)     2280V2R     60 Meg F/R Disk (R)
           2280V3F      90 Meg F/R Disk (F)     2280V3R     90 Meg F/R Disk (R)
           2265V1A      75MB R dual port Dk    2265V2A      288M R dual port Dk
           2265V3       620M R dual port Dk    Q2040        34MB Fixed Disk
                                               2220         76MB Fixed Disk
```

Figure 1-2. COLDSTART System Disk Specification Screen

Enter the device type and address, and press ENTER to continue. The COLDSTART Main Menu appears.

NOTE

COLDSTART works on any drive. However, a system bootstrap must be from a diskette, the fixed disk of a VS25 or VS45, or the removable part of a fixed/removable disk.

The COLDSTART Main Menu, shown in Figure 1-3, allows you to choose a Copy or a Backup operation. Indicate your choice by pressing one of the following PF keys:

PF Key	Function	Description
1	RETURN	Returns to the previous screen.
4	COPY	Allows you to copy data from the input diskette to the system volume.
5	BACKUP	Allows you to preserve undamaged data resident on the system volume.

```
                    *** Wang VS Coldstart ***




            Press PF4 to COPY to system disk, or
                  PF5 to BACKUP the system disk.
            Press PF1 to return to the previous screen.
```
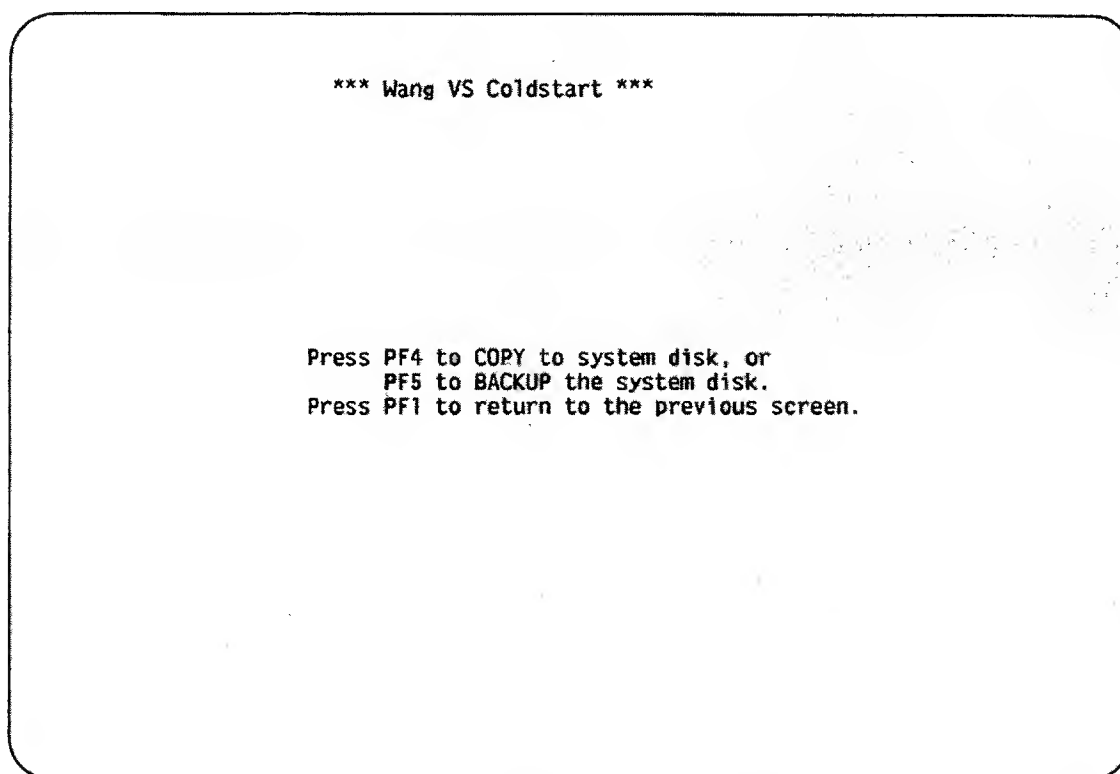
Figure 1-3.   COLDSTART Main Menu

For a Copy operation (PF4), the next screen displayed is the COLDSTART Select Copy Mode screen. This screen, shown in Figure 1-4, allows you to indicate the type of Copy operation you wish to perform. Press the appropriate PF key to indicate your choice:

PF Key	Function	Description
1	RETURN	Returns to the previous screen.
2	INITIALIZE	Initializes the system disk before copying.
3	REFORMAT	Reformats the system disk before copying.
4	COPY	Copies files to the system volume without initializing or reformatting it.

```
                    *** Wang VS Coldstart ***




           Press PF2 to INITIALIZE the system disk,
                 PF3 to REFORMAT the system disk, or
                 PF4 to COPY only.
           Press PF1 to return to the previous screen.
```
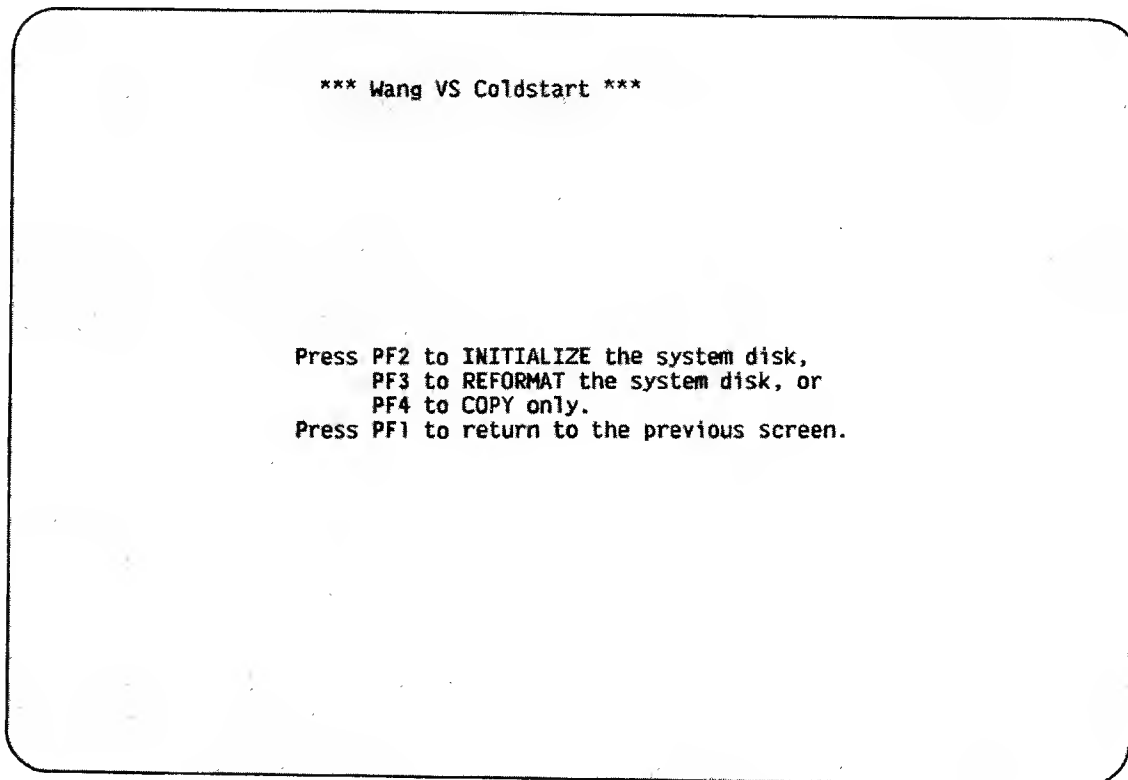
Figure 1-4.   COLDSTART Select Copy Mode Screen

1.4.1 Initializing or Reformatting the System Disk

If you press PF2 or PF3 from the Select Copy Mode screen, the COLDSTART System Disk screen, shown in Figure 1-5, is displayed. This screen requests information that is used by COLDSTART to create the system disk volume label. Your entries are not checked for validity.

Enter the required parameters as follows:

Parameter	Entry
Volume Name	Enter the name of the system volume. Note that the name of each disk in a dual fixed-disk drive system must be unique.
Volume Owner	Enter the owner of the volume. The volume owner consists of 1 to 14 characters.
Date	Enter the current date using the MM/DD/YY format.
VTOC Size	Enter the number of blocks you want to allocate for the VTOC. The default varies according to disk size. The VTOC size shown in Figure 1-5 is for the fixed internal disk of the VS25.


```
                      *** Wang VS Coldstart ***

                            System Disk


          The following information is required for volume formatting:


              Volume name                - ******
              Volume owner               - **************
              Date (MM/DD/YY)            - ** / ** / **
              VTOC size (in blocks)      - 112



              Please supply the required parameters and press ENTER.
              Or press PF1 to return to the mode selection screen.
```

Figure 1-5. COLDSTART System Disk Screen

After you enter the information, press ENTER to continue processing, or press PF1 to return to the Select Copy Mode screen.

If you press ENTER, the COLDSTART Control Mode Dump and Paging Files screen, shown in Figure 1-6, is displayed. The screen requests additional information that is used by COLDSTART to create the system disk volume label with appropriate VTOC information. Your entries are not checked for validity.

```
                        *** Wang VS Coldstart ***




          Size of preallocated dump file  = 00000 K

          Size of paging pool              = 00000 K
          Pool location (relative to VTOC) = 0
               0 = Nearest VTOC
               9 = Farthest from VTOC

          Please supply the required parameters and press ENTER.
```

Figure 1-6. COLDSTART Control Mode Dump and Paging Files Screen

1-9

Enter the required parameters as follows:

Parameter	Entry
Size of Preallocated Dump File	Enter the size (in kilobytes) of the preallocated control mode dump file. The file size should correspond to main memory size for your system. Accept the default value (zero) if you do not want to allocate a dump file at this time. (Control mode dump procedures are described in the VS System Operator's Reference.)
Size of Paging Pool	Enter the size (in kilobytes) of the user paging pool. Paging pool size is based on the number of tasks and their segment 2 sizes that can use this disk for paging. Accept the default value (zero) if you do not want to allocate a paging pool at this time. (Paging pools are described in the VS System Utilities Reference.)
Pool Location	Enter the location of the user paging pool. Accept the default (zero) if you are not allocating a paging pool at this time.

After you enter the information, press ENTER to continue processing or press PF1 to return to the Select Copy Mode screen.

If you press ENTER, COLDSTART then initializes or reformats the system disk. The message "Disk Formatting in Progress" is displayed during either process.

1.4.2 Copying

When the initialization or reformatting is completed, or if you pressed PF4 from the Select Copy Mode screen (refer to Figure 1-4), COLDSTART requests that you mount the first disk to be copied.

The files you are copying are often on more than one diskette. As each diskette is copied, COLDSTART requests that you mount the next diskette in sequence. It obtains the name of the next diskette to be mounted from the current one and displays: "All files in this diskette have been copied. Please mount ******," where ****** is the name of the next diskette.

When the last diskette has been copied, COLDSTART displays the message "IPL when ready." Continue the process by setting the BOOTSTRAP MEDIA switch to the middle position. This sets the fixed disk as the IPL device. Then press the IPL button. You also have the option to copy more files to the system disk without IPLing or to clear the disk by pressing PF1.

At this point, the system software you just loaded takes over to complete the IPL. Its first step is to load the diagnostic monitor; it asks you to proceed with the diagnostic testing by pressing ENTER. The next screen displayed is the SYSGEN Configuration File screen. Proceed as you would for a normal IPL (see the VS System Operator's Reference).

When the system comes up, load any other files you need with the Backup utility.

1.4.3 Backup

The Backup mode is useful to preserve data on your system volume when that volume has been damaged in such a way that it can be read but you cannot IPL from it. The Backup mode does not solve the problem of a damaged disk, but it does help you recover as much data as possible.

The initial steps in the Backup process are the same as those for the Copy mode. Set the BOOTSTRAP MEDIA switch to the top position, enter the system volume's device type and address (see Figure 1-2), and press PF5 from the COLDSTART Main Menu (see Figure 1-3).

The COLDSTART Diskette Volume Label screen, shown in Figure 1-7, then requests you to enter the information necessary to write the output volume label.

```
                    *** Wang VS Coldstart ***
                         Backup Diskette


       The following information is required for volume formatting:


             Volume name                : ******
             Volume owner               _ **************
             Date (MM/DD/YY)            _ ** / ** / **
             VTOC size (in blocks)      _ 008



       Please supply the required parameters and press ENTER.
```

Figure 1-7.   COLDSTART Diskette Volume Label Screen

Enter the parameters as follows:

Parameter   Entry

Volume Name   Enter the name of the diskette to be mounted.

Volume Owner   Enter the name of the owner of the volume. The
                 volume owner name consists of 1 to 14 characters.

Date   Enter the current date using the MM/DD/YY format.

VTOC Size   Enter the number of blocks you want to allocate for
                 the VTOC. The default is 008.

Press ENTER to continue processing. This screen appears throughout the Backup process before each request to mount the next diskette.

```
┌──────────────────────── NOTE ────────────────────────┐
│                                                       │
│  The  Backup  mode  reformats  but  does  not  initialize  output │
│  diskettes.   Any  diskette  you  plan  to  use  as  output  for  this │
│  process  must  be  initialized  before  loading  COLDSTART.    Do │
│  not use duplicate volume names for the output diskettes.         │
│                                                       │
└───────────────────────────────────────────────────────┘
```

As for the Copy mode, the label information is not checked for
validity, the default value for the VTOC length is based on the device
type, and the name must be unique.

1.5 RUNNING CIP

The CIP Volume Specification screen, shown in Figure 1-8, is
displayed when you select the CIP option from the Stand-Alone Utility
Selection screen (Figure 1-1).

```
         *** Wang VS Stand-Alone Compress-in-Place Program ***


    This program will consolidate free extents on a disk for the purpose
    of providing useful free space on the disk and improving performance by
    reducing disk seek time.


    Please specify the name of the volume to be compressed and press (ENTER):

                        VOLUME  =  ******
```
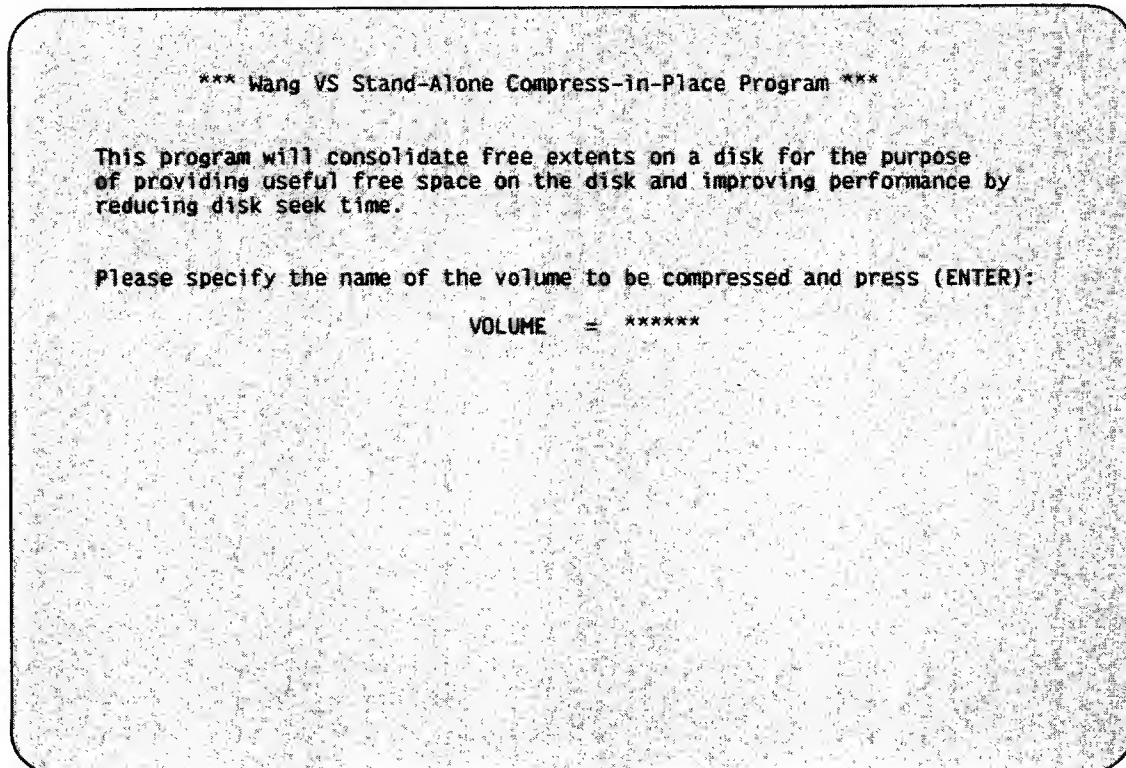
Figure 1-8. CIP Volume Specification Screen

Enter the name of the volume you want to compress, and press ENTER to continue.

The CIP Verification screen, shown in Figure 1-9, then asks you to confirm the compress operation for the specified volume (named MYDISK in this example).

```
          *** Wang VS Stand-Alone Compress-in-Place Program ***




              You have selected to compress volume MYDISK

                  Press (ENTER) to compress this volume

                                 - or -

             Press (1) to return to the volume specification screen
```
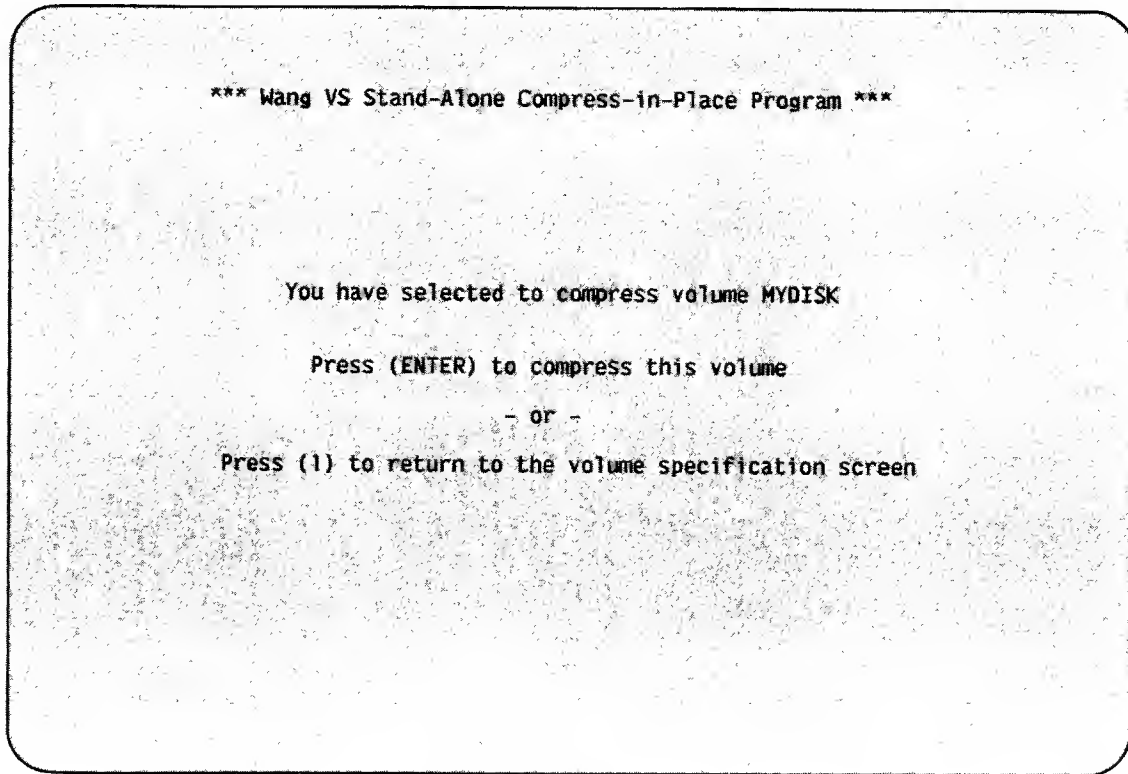
Figure 1-9. CIP Verification Screen

If you press PF1, the program returns you to the CIP Volume Specification screen (Figure 1-8).

If you press ENTER, the following message is displayed:

Compress of volume MYDISK in progress

After completion of the compress, the following message is displayed:

Volume MYDISK has been successfully compressed

At this time, you must re-IPL the system to perform other operations.

1.6 COLDSTART ON OTHER VS SYSTEMS

The COLDSTART utility is most often used to bring up a new VS25 or VS45. However, you can use COLDSTART on any other VS system. (You can also use CIP on any single-disk VS system that has 512K of real memory.) This section details the special steps you must take to process COLDSTART on these systems. The VS50, VS60, and VS80 are treated together in Section 1.6.1, with the VS80 serving as the example system. The VS85, VS90, and VS100 are detailed in Section 1.6.2.

Your need to run COLDSTART on these VS systems depends on the system configuration. For instance, COLDSTART can be useful if your VS80 is configured with a single disk drive. You can also use it to load new versions of system software on a VS80 or VS100 without rebuilding the entire system. This process is accomplished by using the Copy mode to overlay existing system files.

1.6.1 VS80 Procedure

The following procedure details the steps necessary to prepare a VS80 to run COLDSTART for the purpose of loading system software. COLDSTART for the VS80 is on single-sided, single-density, hard-sectored diskettes (white label), whereas COLDSTART for other machines is on double-sided, double-density, soft-sectored diskettes (red label). If your system is currently running, proceed to Step 5 below:

1. Power up Workstation #0, the operator's console.

2. Power up the CPU. The CPU ON/OFF switch is located on the lower left corner of the back panel.

3. Power up the disk drives one at a time. On the 2265V, first turn on the AC POWER switch and then the POWER SUPPLY switch(es).

4. Load the read/write heads on the disk drives by pressing the START button on the front panel. Wait at least five seconds before pressing the START button of the next drive.

5. Press the CONTROL MODE button on the upper right front of the processor. Then press the INITIALIZE button on the upper right front of the processor. Workstation #0 then displays CONTROL MODE F 04, where F 04 is the default value indicating which device is to be used as the system volume. Press the BACKSPACE key and enter R **, where R indicates that the device is a removable disk and ** indicates the hexadecimal device number. Because you are using the COLDSTART diskettes as the system volume, enter the device number of your diskette drive and press ENTER.

6. Insert the FORMAT diskette and press ENTER. Proceed with the COLDSTART process as detailed in Section 1.4. Enter the appropriate device type (F or R) and address (a hexadecimal default value is displayed) for the output volume.

   Note that the output volume is media-tolerant by default. Thus, its VTOC requires more than four times the disk space of a VTOC without fault tolerance.

7. When all files have been copied, proceed with your normal IPL procedure.

1.6.2 VS100 Procedure

The following procedure details the steps necessary to prepare a VS100 to run COLDSTART for the purpose of loading system software. If your system is currently running, proceed to Step 6 below:

1. Power up Workstation #0, the operator's console.

2. Power up the CPU. The CPU ON/OFF switch is located on the lower right corner of the front panel.

3. Power up the disk drives one at a time. On the 2265V, first turn on the AC POWER switch and then the POWER SUPPLY switch(es).

4. VS100 processors require that you load the system microcode as well. This is done by pushing the Bootstrap (BT) button, which is the leftmost button on the upper right front of the processor. The buttons on this panel are arranged as follows, where BT stands for Bootstrap and CM is Control Mode:

        BT o   o CM

                     o INITIALIZE

                     o LOAD

   Next, open the front panel door. If it has not been done, load the minidiskette into the drive. A red LED on the front of the drive then lights up. If the load is successful, the READY light (second from the left on the lower right front of the processor) will be steady on. Double check to ensure that the drive LED is extinguished before proceeding, as occasionally the READY light will be steady on before the load is completed. If the READY light continues to blink, call your local Wang Field Service Representative.

5. Load the read/write heads on the disk drives by pressing the START button on the front panel. Wait at least five seconds before pressing the START button of the next drive.

6. Press the CONTROL MODE button on the upper right front of the processor. Then press the INITIALIZE button. Look inside the front door at the array of four digital character panels. The fixed digital display, usually 134B, indicates that you can proceed.

7. At this point, you must indicate which device is to be used as the system volume. The address is determined by calculating the bus adapter number, the IOP number, and the port number of the device to be used. To calculate this, follow the format below:

        BIII PPPP

        where: B = 0   for BA 1
                        1   for BA 2

                  III = 000 for IOP 0
                        001 for IOP 1
                        010 for IOP 2
                        011 for IOP 3
                        100 for IOP 4
                        101 for IOP 5
                        110 for IOP 6
                        111 for IOP 7

            PPPP = 0000 − 1111 for device 0 through 15.

    For example, device 4 on IOP 3 on BA 2 would be:

              BA2 IOP3 Port 4

              BIII PPPP

    Binary: 1011 0100

    Hex: B   4

    Therefore, to indicate that the system volume to be used by IPL is the removable diskette drive on BA 2, IOP 3, device 4, enter R B4 and press ENTER.

8. Insert the FORMAT diskette and proceed with the COLDSTART process
    as detailed in Section 1.4. Enter the appropriate device type
    and address for the output volume. Refer to the table at the
    bottom of the COLDSTART System Disk Specification screen (see
    Figure 1-2) for the correct device type.

    Note that the output volume is media-tolerant by default. Thus,
    its VTOC requires more than four times the disk space of a VTOC
    without fault tolerance.

9. When all files have been copied, proceed with your normal IPL
    procedure.

CHAPTER 2
THE SECURITY SYSTEM

2.1 INTRODUCTION

The VS Security System allows the system administrator to protect system resources against unauthorized use. The first part of this chapter provides general information on using the VS Security System. See Section 2.6 for the procedures to use the SECURITY utility. See Section 2.8 for an example of setting up a security system.

By restricting access to the Security System and to the file containing the System User List, you, as system administrator, can use the Security System to:

- Define, modify, or delete records in the System User List, which contains user IDs and passwords for logging onto the system.

- Define file protection classes unique to your installation.

- Define and modify program access privileges.

- Maintain full control over the resources of the Security System.

There are two functional components of the VS Security System: the SECURITY utility and the PROTECT command.

The SECURITY utility protects resources on the following levels:

- System Level -- The LOGON process restricts access to the system proper to users whose IDs and passwords are contained in the System User List.

- File Level -- Users can access only those files belonging to the file protection class or classes to which they have access rights.

- Access Level -- Each file protection class specifies different access privileges, so that some program files can be modified, some can only be read and executed, and some can only be executed.

The PROTECT command sets a file's or library's protection class, owner, and expiration date. Section 2.7 describes how to use the PROTECT command.

2.1.1 System LOGON Process

Before any interaction with the system can take place, a user must log on by entering a user ID and password. The user cannot continue if the user ID and password are not on the System User List, if another user is logged on under the same ID at another workstation, or if the user is prohibited from logging on at the workstation being used. If the ID and password are accepted, LOGON checks whether the user has a LOGON program or procedure and whether system access is restricted to that program or procedure only. If a LOGON program or procedure is specified for the user, it is automatically run. If not, the program passes control to the Command Processor.

2.1.2 File Classes

Each file, when created, is assigned to a file protection class, at least by default. Up to 30 unique file protection classes can be defined. Programs also can be granted these access rights. A file protection class can be changed later through the PROTECT command. File protection classes are discussed in detail in Section 2.2.

The file class, in conjunction with a user's access rights, determines the files a user can access and the mode of access (read, execute, or write). The large number of file protection classes allows great flexibility in assigning user access privileges, so that users have access only to those files needed to do their work.

There are two types of file protection classes: those defined by the system and those defined by each user installation. The system defines certain classes as unprotected, owner-access only, read-only, and execute-only for all system users. System administrators define the other classes for each installation and assign user access rights to each class individually through the SECURITY utility.

2.1.3 Access Rights

Through the SECURITY utility, you can provide each user with access privileges to zero or more installation-defined file protection classes. The SECURITY utility displays for each user a screen of all 26 installation-definable file protection classes, identified by the letters A through Z. (See the example of setting up a security system described in Section 2.8 for sample screens.) As system administrator, you can then specify for each class whether the user has access and which of the three levels of access (read, write, or execute) is granted. Thus, each user has exactly as much access as needed.

2.2 FILE PROTECTION CLASSES

When created, every program and data file is assigned to a specified
file protection class. Each file can be assigned to one and only one
file protection class, which is indicated with a one-character file class
code. Four of these codes have system-defined meanings, while the
remaining 26 are installation-defined. Table 2-1 lists the
system-defined file class codes.

Table 2-1. System-Defined File Class Codes

Code	Description
Blank	Unprotected (Public) File Files in this class can be accessed by any user or program. This is the default class for files that are not assigned a class.
#	Private File Files in this class can be accessed only by the person who created the file (the owner of record) or a system administrator.
@	Execute-Only File Files in this class can be read or modified only by system administrators or the owner. The files can, however, be executed by any system user or program. This class can be used for program files that can be run by many users, but must be protected against modification by unauthorized personnel. All system utilities should be assigned to this file class at system generation time.
$	Read-Only File Files in this class cannot be modified by any user except system administrators or the owner, but can be read or executed by any system user. This class is used for subroutines and macros that can be read and incorporated into other program files, but must be protected against direct modification by unauthorized personnel. All system macros are assigned to this file class.

The remaining 26 file classes, identified by the letters A through Z, are defined by system administrators and are unique for each installation. As system administrator, you grant each system user access privileges for zero or more of these 26 classes; users cannot access a file in a class for which they have no privileges. Thus you can, by suitably defining file classes, ensure that only those users who have a reason to use a file have access to that file. For example, if class M contains the payroll file, only users with class M privileges can have any kind of access to payroll files. Different users can have different types of access to class M. For example, one can modify while another only can execute.

When a new file is created, the ID of the current user is recorded in the file label, and this user becomes the owner of the record. The file specification prompt that determines the name of a new file has an entry labeled FILECLAS. This option can be preset through PF2 (SET USAGE CONSTANTS) from the Command Processor menu or through a procedure (refer to the VS Procedure Language Reference). The character entered in this field determines the file protection class of the new file. If FILECLAS is blank, the file has an unprotected class. Work files and spooled print files are placed, by default, in the # file protection class.

You can use two methods to ensure that files are assigned to the proper file protection classes. You can publish a list of file categories for all personnel to use when creating files. Or for stricter enforcement, a LOGON procedure for each system user can contain a SET statement that specifies a default file protection class for all files created by that user. Section 2.8 describes LOGON procedures.

The owner of record of a file has full access to that file, even if the owner is not authorized access to other files of that class. Thus file NEWPROG, created and placed in protection class M by user ABC, who has no access rights for class M, can be run, modified, or deleted by user ABC, even though ABC can do nothing else with any other file in class M. The owner of a file can be changed with the PROTECT command, described in Section 2.7.

2.3 PROGRAM ACCESS RIGHTS

Under usual circumstances, a program assumes the access privileges of the user running it. For example, if a user has read access for files in protection class E and runs the COPY program, COPY is given read access to protection class E and can copy any file in this class. If a second user with only execute access to class E runs COPY, the program receives only execute rights for class E and is unable to copy files of this class. When the user finishes running the COPY program, COPY reverts to having no privileges at all.

You may sometimes want to give a program special access privileges of its own, independent of those possessed by a user running the program. For example, the BACKUP utility should be able to read all files on a volume to be copied, even when run by an operator who is not a system administrator. An order entry program run by a clerk should be able to modify a file to which the clerk has read access only. You may, therefore, give program files privileges similar to those of a user. The program's access privileges then supplement those of the user while the user is running that program. In the above instance, the BACKUP program could be given system administrator rights. Any user, then, who has execute access to the BACKUP program can use this program to back up volumes containing files of any class, regardless of the user's own access privileges. The special access privileges given to a program are not passed to the user running the program.

Section 2.6.4 contains an explanation of the method of assigning special privileges to a program. Special access privileges can be granted only to program files, not to procedures or source files. No one other than a system administrator, including the owner of record, can change a program's access privileges.

NOTE

If a disk volume's security status is set to NO, special access privileges are not observed for programs that reside on the disk. Only system security administrators can change the status of disk volumes. Setting the disk SECURE parameter is described in the VS System Operator's Reference.

2.4 SYSTEM USER LIST

The System User List is a data file (USERLIST in library @SYSTEM@ on the system volume) that contains the IDs, names, and access rights of all designated system users. The System User List should be placed in class # with a system administrator as owner of record so that only system administrators can gain access to it. You use the SECURITY utility to add, delete, or modify records in the System User List. Refer to Section 2.6 for more information about SECURITY. Each record in the System User List contains the information listed in Table 2-2.

Table 2-2. System User List Record Components

Item	Description
User ID	A unique ID, up to three alphanumeric characters long.
Password	An optional password, up to eight uppercase characters long. As an additional security measure, display of the password is suppressed when it is entered during logon.
Name	The name of the user. Treated as a comment, it is displayed on the Command Processor menu.
Security Administrator	Defines the user as a system administrator. Allowable values are Y or N. If this value is set to Y, the user has access to all files on the system, including the SECURITY program and all private files. If this value is set to N, the user is not a system administrator and access rights are defined by the values given in File Access Privileges, described below.
File Access Privileges	For users who have limited access, privileges can be specified for one or more of the 26 installation-defined protection classes (A through Z). The four system-defined protection classes are not displayed on the screen because all users have the same access rights to them. For any installation-defined file class, there are four levels of access rights:

Level	Description
Blank	No access rights.
E	Execute-only access rights.
	This level is meaningful only for program files. Files in classes for which this level is specified can be run by the user but not read (i.e., they cannot be copied or linked into another program via the LINKER, nor can they be examined or modified via the Debug Processor).

(continued)

Table 2-2. System User List Record Components (continued)

Item	Description
File Access Privileges (continued)	<u>Level</u> <u>Description</u> R Read and execute access rights. This level of access permits files to be read and executed, but not modified. Program files can be copied, linked, and debugged. Data files can be opened in INPUT mode only. W Write, read, and execute access rights. This is the highest level of access and includes the ability to modify, rename, scratch, protect, and debug files. Note that if Security Administrator is set to Y, access rights for all protection classes are automatically set to W by the system.
LOGON Program or Procedure	Each System User List record can contain the name and location of a program or procedure file. If this file is on a mounted volume and accessible at logon, it is run automatically when the user logs on. If not, an error message is displayed, and the user must press HELP to access the Command Processor menu. (This is possible even for users whose HELP key is otherwise disabled.) The LOGON procedure can be used to perform any automatic service, including specification of SET command values and the execution of specified programs and procedures. Refer to the <u>VS Procedure Language Reference</u> for a discussion of procedure writing. Section 2.8 gives an example of a LOGON procedure.

(continued)

Table 2-2. System User List Record Components (continued)

Item	Description
Segment 2 Address Space Size	Specifies the Segment 2 size individually for each user. The specified value must range from 64K to 512K for VS80/60/50 systems; VS100/90/85 and VS25/45 systems may have a Segment 2 size between 64K and 1024K. When you define a new user, you can leave the Segment 2 size field blank; the system then defaults to the value in effect when the user logs on; this value is defined through the GENEDIT utility. The user's Segment 2 size only displays on the Review User ID screen if a nonblank value was entered.
HELP Processor Disabled	When this field is set to Y, the HELP key does not return the user to the Command Processor menu. In this case, you must give the user a LOGON procedure or program. Note that on a dual mode workstation, explained in the VS System Operator's Reference, even a user whose HELP key has been disabled can use this key to enter operator mode.
Operator Privileges	The two values allowed in this field are Y and N. To assign operator privileges to a user, enter Y in this field; otherwise enter N.
LOGON Restricted	The two possible entries are FROM and TO. If FROM is specified, the user is restricted from logging on at all workstation numbers that are entered. If TO is specified, the user can only log on at the workstation(s) listed. FROM is the default.

2.5 SETTING UP THE SYSTEM USER LIST AT SYSTEM GENERATION

When you generate a VS system, there is one defined user and system administrator with the user ID CSG. You can use this ID to log on to the system and set up the rest of the System User List, including entries for system administrators. After you set up the System User List, you should delete this ID or supply it with a password.

2.6 RUNNING SECURITY: MODIFYING THE SYSTEM USER LIST AND PROGRAM ACCESS RIGHTS

You modify or display the System User List by means of the SECURITY utility. You should restrict access to the System User List by placing it in the # file protection class, so that only users with system security administrator privileges have access to it.

When you run SECURITY, the first screen displays a menu with the following options, each of which is described further in the subsections that follow:

PF Key	Function
1	Review, modify, or delete user records
2	Add a new user
9	Review or modify program access privileges
12	Review or modify intersystem access privileges
13	Review the instructions for SECURITY
15	Print listing of users
16	Exit from program

NOTE

Because SECURITY does not issue GETPARM screens, it cannot be proceduralized.

2.6.1 Review, Modify, or Delete User Records

Enter the user ID of the user to be reviewed and press PF1. If you leave the initials blank, the screen displays the first ID in alphabetical order. If you enter an incorrect ID, the screen displays the next valid ID in alphabetical order. To modify a record, press PF9, enter the changes, and then press ENTER. Press PF12 to delete a record. As system administrator, you can modify all information for any other user, except for the user ID, which cannot be modified; you can modify only the password, LOGON procedure, HELP-disabled option, and workstation restrictions of the System User List record associated with your own user ID. A system administrator's record can be deleted only by another system administrator; administrators cannot delete their own records.

From this screen, you can also supply an ID and press the appropriate PF key to perform the following:

- Inspect the first record (PF2)
- Inspect the next record (PF5)
- Inspect another record (PF8)
- Modify the record (PF9)
- Delete the record (PF12)
- Return to the SECURITY program menu (PF16)

By pressing PF13 from the MODIFY screen, you can review instructions for the various parameters that can be assigned to a user.

2.6.2 Add a New User

You can select the same options here that are listed for PF1 in Section 2.6.1. However, you must supply a user ID, and each user ID must be unique. After adding a record, press ENTER, and a new blank user record format screen appears. Press PF1 to return to the Main Menu or press PF13 to review the instructions for user records.

2.6.3 Review, Modify, or Delete Intersystem Access Privileges

To review or modify intersystem access privileges, press PF12 from the Main Menu. You have the option of entering a system name; if the system name is left blank, the first system is assumed.

2.6.4 Review or Modify Program Access Privileges

To review and modify a program's special access privileges, enter the file, library, and volume name and press PF9. The next screen displays the 26 file classes and whether or not the program has security administrator status (that is, write access to all 26 file classes). To modify program access privileges, enter the changes and press ENTER.

2.6.5 Review the Instructions for SECURITY

Press PF13 from the Main Menu to obtain an explanation for each PF key option from that menu.

2.6.6 Print the System User List

Press PF15 from the Main Menu to print a listing of all user information except passwords. No screen display is provided. Because this listing contains privileged information, you should take special care when requesting this printout, and you should also store this listing in a secure location.

2.7 PROTECT COMMAND: CHANGING FILE OWNERSHIP AND FILE PROTECTION CLASS

To change or inspect a file or library's protection class, press PF5 (MANAGE FILES/LIBRARIES) from the VS Command Processor menu. A prompt then asks for the names of the file, library, and volume to be inspected. After you enter this information and press ENTER, the list of files or libraries is displayed. Press PF9 (PROTECT) to display the protection parameters of the file or library. The following information is provided:

- File Protection Class -- The file protection class to which a file is assigned determines which users have access to that file. For a discussion of the available codes, refer to Section 2.2 and to the VS Programmer's Introduction.

- Current Owner of Record -- The owner of record always has access to the file.

- Expiration Date -- The file cannot be scratched or renamed by the Command Processor or a procedure before the specified expiration date.

An error message is displayed if anyone other than the owner of record or a system administrator attempts to change these parameters. Make the appropriate modifications and press ENTER. Yo return to the Command Processor menu, press HELP.

2.8 SETTING UP A SECURITY SYSTEM - AN EXAMPLE

Suppose the following departments are using the same VS system:

- Order Entry
- Personnel
- Sales Operations
- Manufacturing
- Research and Development
- Marketing
- Payroll

The VS installation has files that have been organized according to the following classifications:

Files	Class
Work Order Files	W
Product Files	P
Customer Files	C
Sales Quota File	Q
Pension Administration File	R
Payroll File	M
Proprietary Programs and Procedures	X
Confidential Project Documentation Files	D
Restricted System Utilities	S
Security System and Owner-Only Files	#
Other System Utilities	@
Open-Access Files	blank
Macros and Tables	$

Using the VS Security Administration Worksheet provided in Figure 2-1, you can establish a table of file protection classes and user privileges like that shown in Figure 2-2.

WANG VS SYSTEM

SECURITY ADMINISTRATION WORKSHEET

				SECURITY ADM	FILE (LIBRARY) CLASSIFICATION																										SEG 2 ADDR SIZE	HELP DISABLED	OPERATOR PRIV	WORK STATIONS	
USER/PROGRAM	PASSWORD	ID	LOGON		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z					
1.																																				
2.																																				
3.																																				
4.																																				
5.																																				
6.																																				
7.																																				
8.																																				
9.																																				
10.																																				
11.																																				
12.																																				
13.																																				
14.																																				
15.																																				
16.																																				
17.																																				
18.																																				
19.																																				
20.																																				
USER/PROGRAM	PASSWORD	ID	LOGON		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z					

W = WRITE +   R = READ +   E = EXECUTE   N = NO ACCESS

Figure 2-1. Security Administration Worksheet

2-13

WANG VS SYSTEM

SECURITY ADMINISTRATION WORKSHEET

File (Library) Classification column legend (handwritten italic labels): C = Customers, D = Priv. Docum., L = Payroll, P = Products, Q = Sales Quotas, R = Pension, S = Restr. Utilities, W = Work Orders, X = Priv. Prog.

USER/PROGRAM	PASSWORD	ID	LOGON	SEC ADM	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	SEG 2 ADDR SIZE	HELP DISABLED	OPERATOR PRIV	WORK STATIONS
1. Order Entry Clerk			Clerk	N			W													R	W						W				256	Y	N	70/032 033 034
2. Marketing			Logon	N			R	R												R	W						R	E			256		N	704/000
3. Mark Sanders	Password	MOS	Logon	N			W	R								R				W	W	R	R				W				256		N	
4. Sales-Ops			Logon	N			R	R								R					W										256	Y	N	70/032 033 034
5. George Kensington	PGMR	GBK	Logon	Y																											256 ▶		Y	
6. Personnel			Person	N												W				W	W	E									256	Y	N	704/000
7. R&D																																		
8. Bob Dooley	IBSS0000	BD	Logon	Y																											256 ▶		Y	
9. Ronald Brown	DAGR1111	RS	Logon	N				W															W				W				256		N	
10. Mary Vereen	PUBS0001		Logon	N				W								R				W	W		E								256		N	
11.																																		
12. Backup				Y																											▶			
13. Payr Ø1				N													W					W												
14. Arec Ø1				N	W															R	W						R							
15. VS update				N				W													W						R							
16.																																		
17.																																		
18.																																		
19.																																		
20.																																		

W = WRITE +   R = READ +   E = EXECUTE   N = NO ACCESS

Figure 2-2.   Completed Sample Security Administration Worksheet

Once the system is implemented, you might assign all order clerks the same LOGON procedure and set the parameters on each clerk's user screen, as shown in Figure 2-3. Order clerks are allowed read access to the product files (class P), so that they or their program can check product numbers. The clerks, however, cannot update these records unless they run a program that has been given write access to class P, such as VSUPDATE in Figure 2-2. Clerks have write access to sales quota and work order files (classes Q and W), so they can update sales personnel records and create orders to fill requests. The HELP key is disabled because the order clerks have no need to access programs not included in their LOGON procedure. Workstation #0 (the operator's console) is not used by clerks in this hypothetical situation; workstations 32 and 33 might be work areas reserved for programmers.

LOGON procedure CLERK, specified in the System User List record in Figure 2-3, would automatically run the DATENTRY utility when user ABC logs on and would automatically log this user off when DATENTRY terminates. Refer to Section 2.8.2 for a sample procedure that performs these functions.

Figure 2-3. Sample Order-Entry Clerk User List Record

Marketing employees who demonstrate the system to clients might all
have a user record similar to that for user BWS in Figure 2-4. User BWS,
who is responsible for demonstrating programs to prospective customers,
has execute access to proprietary programs in class X that are to be
demonstrated. BWS cannot copy, link, or debug such programs. BWS has
read access to files in class C and W needed to demonstrate how customer
and product files work, and write access only to class P files that must
be updated in the course of the demonstration. The HELP key is not
disabled, so that user BWS can use the VS Command Processor menu to
select a variety of programs to demonstrate. Finally, user BWS has logon
restrictions that limit logon access to the four workstations (0, 34, 35,
and 36) located in the firm's demonstration room.

```
USER BWS   -  PASSWORD MKT3****  -  NAME  HOW ARE YOU?*************

            USER'S FILE ACCESS PRIVILEGES (by File Class)

              Security Administrator .......  N

        A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
        * * * * * * * * * * * * * * * R W * * * * * W * * *

Logon Procedure (Program) is LOGON***   in Library LOGON*** on Volume VOL444

              Segment 2 Address Space Size ........ XXXX

                 HELP Processor Disabled ..... N

                  Operator Privileges ..... N

                 LOGON RESTRICTED TO   WORKSTATION(s)

000 034 035 036 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          PRESS (ENTER) TO ADD THIS USER TO THE SYSTEM   OR SELECT:
                (1) RETURN to MENU    (13) INSTRUCTIONS
```

Figure 2-4. Sample Marketing Employee User List Record

2.8.1 LOGON Procedure for Order Entry Clerks

Below is the procedure CLERK, which is specified as the LOGON
procedure for user ABC in Figure 2-3. It limits the clerk to executing
the DATENTRY utility and logs the clerk off when DATENTRY is finished.

```
PROCEDURE FOR ORDER ENTRY #2
RUN DATENTRY
ENTER INPUT FILE=ORDER2, LIBRARY=ORDERS, VOLUME=WORK02,
     CTLFILE=ORDCTL02, CTLLIB=ORDERCTL, CTLVOL=WORK02
ENTER INPUT 16
LOGOFF
```

2.8.2 LOGON Procedure to Set Protection Classes for Output Files

The following short procedure ensures that all files created by this
user are assigned to file protection class A by default. Note that the
default value can be overridden by the user for any file at the time the
file is created.

```
PROCEDURE TO SET FILE PROTECTION CLASS
SET FILECLAS=A
```

CHAPTER 3
SYSTEM GENERATION (SYSGEN)

3.1 SYSTEM GENERATION (SYSGEN) PROCESS

This section contains a description of the System Generation (SYSGEN) process for Release 6.0. Refer to Section 3.2 for a discussion of the GENEDIT utility, which you use to create or modify configuration files.

3.1.1 SYSGEN Overview

The SYSGEN procedure allows you to perform a system generation quickly and interactively. You create or edit a system configuration file through the GENEDIT utility, which prompts you to select Input/Output Processors (IOPs), the position of devices on the IOPs, and the types of devices on the system. You can use GENEDIT to create several configuration files; the default name of the system configuration file is @CONFIG@. Actual system generation occurs dynamically at Initial Program Load (IPL) time, when you can select the system configuration file.

3.1.2 SYSGEN Conversion Process

The SYSGEN conversion process consists of several preparatory steps, followed by the use of the GENEDIT utility to specify the hardware configuration.

Preparing for the Conversion

To convert a system from Release 5.01.51 or a subsequent release to Release 6.0, you must perform several steps prior to running the actual SYSGEN procedure.

```
┌──────────────────────── NOTE ────────────────────────┐
│                                                       │
│  The operating system and system software are distributed │
│  with the Engineering Change Order (ECO) for Release 6.0. │
│  Also included is a series of instructions for loading the │
│  software onto the system.  Refer to those instructions for │
│  information about loading the software onto your system.  │
│                                                       │
└───────────────────────────────────────────────────────┘
```

Before beginning any of the steps in the SYSGEN procedure, make sure you do the following:

- Back up the system pack to a reliable disk pack.

- Have system security administrator access privileges.

- Give the SYSGEN pack any name, as long as no other volume on the system has the same name.

- Do not run any software that requires new Engineering Change Numbers (ECNs) until the SYSGEN procedure is complete and the ECNs have been installed.

- Have a hard copy of the system's up-to-date configuration file with you during the GENEDIT run.

- Check that the system volume to be updated does not contain libraries named #SYSTEM#, #SYSTST#, #MACLIB#, or #LINKLIB.

Converting to Release 6.0

The following steps explain the complete SYSGEN process necessary to convert from a Release 5.01.51 or subsequent release to a Release 6.0 operating system:

1. Mount the SYSGEN volume containing the Release 6.0 software. IPL from the SYSGEN volume; the IPL screen is then displayed. Press PF1 to specify a minimum configuration (one workstation and one disk drive). Log on as user CSG.

2. Run GENEDIT and create a new configuration file, using the hard copy of the old configuration file for reference. GENEDIT is described in detail in Section 3.2. The new configuration file should be named @CONFIG@ in library @SYSTEM@ on the SYSGEN pack. When GENEDIT is completed, log off.

3. Re-IPL using the configuration file on the SYSGEN pack created in Step 2. <u>Inhibit logons</u>. Copy the configuration file from the SYSGEN pack to the system pack. Name the output file @CONFIG@ in @SYSTEM@.

4. IPL from the system volume; select either @CONFIG@ or another configuration file name when the Configuration prompt is issued.

Post-SYSGEN Procedures

After the SYSGEN process is completed, perform the following steps:

1. Test the new operating system. Test the new configuration to make sure that all specified devices are available.

2. Install any required ECNs. Contact your Wang Customer Engineer for the current ECN that is required for hardware and software support.

3.1.3 Hardware Requirements

Before installing Release 6.0, make sure the following hardware requirements are met:

1. Word processing sites must have a printer available for document printing. Ensure that a printer that supports word processing is available on the system.

2. The device type switch settings for workstations and printers must be verified for the proper settings by the Wang Customer Engineer.

3.1.4 Differences Between SYSGEN Release 5.01 and Release 6.10

SYSGEN Release 6.10 has the following characteristics that distinguish it from Release 5.01.51:

- Many new devices are supported on the VS.

- The SYSGEN procedure described in this manual is for the VS100, VS90, VS85, VS80, VS60, VS50, VS45, and VS25.

- TOTAL and WangNet are now supported on the VS.

- The GENERATE program is no longer part of the SYSGEN procedure. Software installation is performed according to the instructions provided with the ECO for the software release.

- The System Options menu in GENEDIT has been revised to allow selection of European or American date format, DMS/TX support, the WangNet ID name, and timeout for sharer deadlock.

3.1.5 Differences Between SYSGEN Release 6.10 and Release 6.20

SYSGEN Release 6.20 has the following characteristics that distinguish it from Release 6.10:

- The GENEDIT General Configuration screen now requests that you specify the number of WangNet workstation lines to be configured in your system. If you specify more lines than can be supported in the configuration, only the maximum number supported is generated when you create the configuration file. GENEDIT notifies you of this by displaying a message just before the configuration file is created.

- The device adapter configuration can now be selected and modified for the VS25 and VS45. GENEDIT displays an IOP Selection screen for specifying the number and types of device adapters in the system.

- To enable automatic activation of remote workstations, GENEDIT now allows you to define the parameters for remote devices in a configuration file.

3.2 GENEDIT UTILITY

This section describes how to use the GENEDIT utility to create new configuration files or to modify existing ones.

3.2.1 Introduction

You use the GENEDIT utility to edit an existing configuration file or to create a new configuration file. You can run GENEDIT at any time after the system is IPLed, even while other users are on the system. The GENEDIT utility specifies a hardware configuration for your system. Because the configuration information is stored in a file, you can have several files corresponding to different configurations on the system at one time. The changes you make to a configuration file will not be in effect until the system is IPLed using that configuration file.

3.2.2 Running GENEDIT

To run GENEDIT, first press PF1 (RUN PROGRAM OR PROCEDURE) from the VS Command Processor menu. Type GENEDIT in the field provided for the program name and press ENTER. The Configuration File Specification screen, shown in Figure 3-1, then allows you either to edit an existing configuration file or to create a new one. To edit an existing file, type the file, library, and volume names on the indicated lines. To create a new file, leave the lines blank. Next, specify the CP model and system being configured by entering one of the following:

    CP 3   VS80, VS60, or VS50
    CP 4   VS100, VS90, or VS85
    CP 5   VS25 or VS45

After specifying the CP model and system, press ENTER.

```
                *** WANG VS GENEDITOR ***

        Please (ENTER) The Config File to be Edited

                FILE     = ********

                LIBRARY  = ********

                VOLUME   = ******

                    CP = *   = 3 for VS/80, VS/60, and VS/50
                            = 4 for VS/100
                            = 5 for VS/25 and VS/45


            Press (ENTER) with a BLANK Filename to
                 Create a New Config File



                  Press (PFK 16) to EXIT
```

Figure 3-1. Configuration File Specification Screen

The system then checks the VS device data base, DEVLIST, which contains the device definitions for all possible VS configurations. To ensure up-to-date device information, GENEDIT builds its device and IOP tables from the DEVLIST file. While the tables are being constructed internally, the following message appears on the screen:

> The IOP and device tables are being built
> from the DEVLIST in @SYSTEM@ on the IPL volume.
> Please wait.

The time required to build the tables depends on the workload on the system at the time DEVLIST is accessed. Building all the tables usually takes about thirty seconds; then the System Options menu, shown in Figure 3-2, is displayed if you are creating a new configuration file. If you are accessing an existing configuration file, the system displays the General Configuration screen, shown in Figure 3-3. Once the tables are built during a GENEDIT run, they remain; they need be rebuilt only if you return to the first screen, shown in Figure 3-1, and change the CP model. Even then, only IOP information is updated and should require a wait period of only a few seconds.

3.2.3 System Options Menu and General Configuration

The System Options menu, shown in Figure 3-2, contains a list of system parameters. You can modify the default values displayed for each parameter by typing the new value in the appropriate field and pressing ENTER.

```
                    *** WANG VS GENEDITOR ***

                         System Options

        System Name                     the WANG VSXXXXX
        System WANGNET ID                   WANGVSXX
        European/American date format          A
        Supports Word Processing               N
        Supports Mailway                       N
        Supports DMS/TX                        N
        Clock Rate (50/60 Hz)                 60
        Number of TOTAL DBMS tasks             0
        Devices per TC IOP                    16
        Devices per extended serial IOP       16


        Task Options                    Sharer Options

   Maximum open files        25      Number of buffers      10
   Maximum link levels       16      Fix buffers             N
   Maximum PCEXITS            8       Fix control blocks      N
   Segment 2 default        256       Timeout for deadlock   90


               Press (ENTER) to continue
```

Figure 3-2. System Options Menu

Table 3-1 lists the fields that are available on the System Options menu. Table 3-2 lists all the parameters along with the permissible range of entries and defaults for each CP model.

Table 3-1. System Options Menu Available Fields

Field	Description
SYSTEM OPTIONS	
System Name	Identifies the system.
System WangNet ID	Identifies this system in the WangNet network.
European/ American Date Format	American format (MM/DD/YY) or European format (DD/MM/YY) for dates. The system does not take its date format from this input; this is available for customer use only.
Supports Word Processing	Specifies VS Word Processing support.
Supports MAILWAY®	Specifies MAILWAY® support.
Supports DMS/TX	Specifies DMS/TX support.
Clock Rate (50/60 Hz)	Specifies the clock rate to be used.
Number of TOTAL DBMS Tasks	Specifies the number of TOTAL DBMS tasks permitted.
Devices per TC IOP	Specifies the default number of devices per TC IOP.
Devices per Extended Serial IOP	Specifies the default number of devices per extended serial IOP for clustered devices.

(continued)

Table 3-1. System Options Menu Available Fields (continued)

Field	Description
TASK OPTIONS	
Maximum Open Files	Specifies the maximum number of open files allowed on the system for any one task.
Maximum Link Levels	Specifies the maximum number of link levels allowed per task.
Maximum PCEXITS	Specifies the maximum number of PCEXITS per task.
Segment 2 Default	Specifies the Segment 2 default size for foreground tasks. This size can be overriden by the user ID record (described in Section 2.4).
SHARER OPTIONS	
Number of Buffers	Specifies the maximum number of file buffers that can be used by the sharer.
Fix Buffers	Specifies whether the buffers are pageable (N) or page-fixed (Y).
Fix Control Blocks	Specifies whether the sharer control blocks are pageable (N) or page-fixed (Y).
Timeout for Deadlock	Specifies the amount of time the sharer allows a deadlock situation to exist.

Table 3-2. System Parameters

Parameter	CP 3 VS80/60/50 Range	Default	CP 4 VS100/90/85 Range	Default	CP 5 VS25/45 Range	Default
SYSTEM OPTIONS						
System Name	0-16 char.	The WANG VS	0-16 char.	The WANG VS	0-16 char.	The WANG VS
System WangNet ID	0-8 char.	WANGVS	0-8 char.	WANGVS	0-8 char.	WANGVS
European/American						
Date Format	E or A	A	E or A	A	E or A	A
Supports Word Processing	Y or N	N	Y or N	N	Y or N	N
Supports MAILWAY®	Y or N	N	Y or N	N	Y or N	N
Supports DMS/TX	Y or N	N	Y or N	N	Y or N	N
Clock Rate (50/60 Hz)	50 or 60	60	50 or 60	60	50 or 60	60
Number of TOTAL						
DBMS Tasks	0 - 3	0	0 - 3	0	0 - 3	0
Devices per TC IOP	NA	NA	1 - 32	16	1 - 32	16
Devices per Extended						
Serial IOP	NA	NA	1 - 32	16	1 - 32	16
TASK OPTIONS						
Maximum Open Files	1 - 9999	25	1 - 9999	25	1 - 9999	25
Maximum Link Levels	1 - 99	16	1 - 99	16	1 - 99	16
Maximum PCEXITS	1 - 99	8	1 - 99	8	1 - 99	8
Segment 2 Default	64K-512K	256K	64K-1024K	256K	64K-1024K	256K
SHARER OPTIONS						
Number of Buffers	0 - 99	10	0 - 99	10	0 - 99	10
Fix Buffers	Y or N	N	Y or N	N	Y or N	N
Fix Control Blocks	Y or N	N	Y or N	N	Y or N	N
Timeout for Deadlock	1 - 255	90	1 - 255	90	1 - 255	90

After you modify the system, task, and sharer parameters and press ENTER, the General Configuration screen, shown in Figure 3-3, allows you to specify the number of peripheral devices and noninteractive tasks (background jobs) in the configuration file. Enter the number of workstations, printers, disks, tapes, telecommunications (TC) lines, noninteractive tasks, and WangNet workstation lines (CIU or TCB1 lines), and press ENTER. If you specify more WangNet workstation lines than can be supported in the configuration, only the maximum number supported is generated when you create the configuration file. (GENEDIT notifies you of this by displaying a message just before the configuration file is created.)

In Figure 3-3, the user has configured a system that consists of eight workstations, three printers, six disks, one tape drive, and one TC line.

```
                    *** WANG VS GENEDITOR ***

           Please select your general configuration:


                    008  WORKSTATIONs
                    03   PRINTERs
                    06   DISKs
                    01   TAPEs
                    01   TC LINEs

                    000  NON-INTERACTIVE TASKs

                    000  WANGNET workstation lines



                    Press (ENTER) to continue

                        (16) RESTART
                        (30) SYSTEM MENU
```

Figure 3-3. General Configuration Screen

Table 3-3 lists the maximum numbers of peripherals and noninteractive tasks permissable for each CP model. If you enter a number exceeding the maximum allowed for a specific CP model, GENEDIT produces an error message. You cannot proceed until you reduce the value to the maximum number allowed.

Table 3-3. Maximum Supported Configuration

Peripherals/Tasks	VS100/90/85	VS80/60/50	VS25/45
Serial Devices (Workstations and Printers)	128	32	16 (VS25) 32 (VS45)
Large Disks	16	8	4
Noninteractive Tasks	24	8	8

After entering the general configuration, you can press either PF16 to restart the GENEDIT program or PF30 to return to the System Options menu. If you press ENTER, the Noninteractive Task Segment 2 Sizes screen, shown in Figure 3-4, allows you to set the Segment 2 size for noninteractive tasks (background jobs). If you do not have any background jobs, the screen is bypassed. The default value is 512K, but you can set the Segment 2 size to a minimum of 64K, increasing by increments of 4K to the maximum size allowed. The maximum Segment 2 size allowed depends upon the CP model specified: For CP 3 (VS80/60/50) the maximum is 512K; for CP 4 (VS100/90/85) and for CP 5 (VS25/45) the maximum is 1024K.


```
                    *** WANG VS GENEDITOR ***

              Non-interactive task segment 2 stack sizes (K)

        *512
        *512
        *512
        *512




                     PRESS (ENTER) TO CONTINUE
```
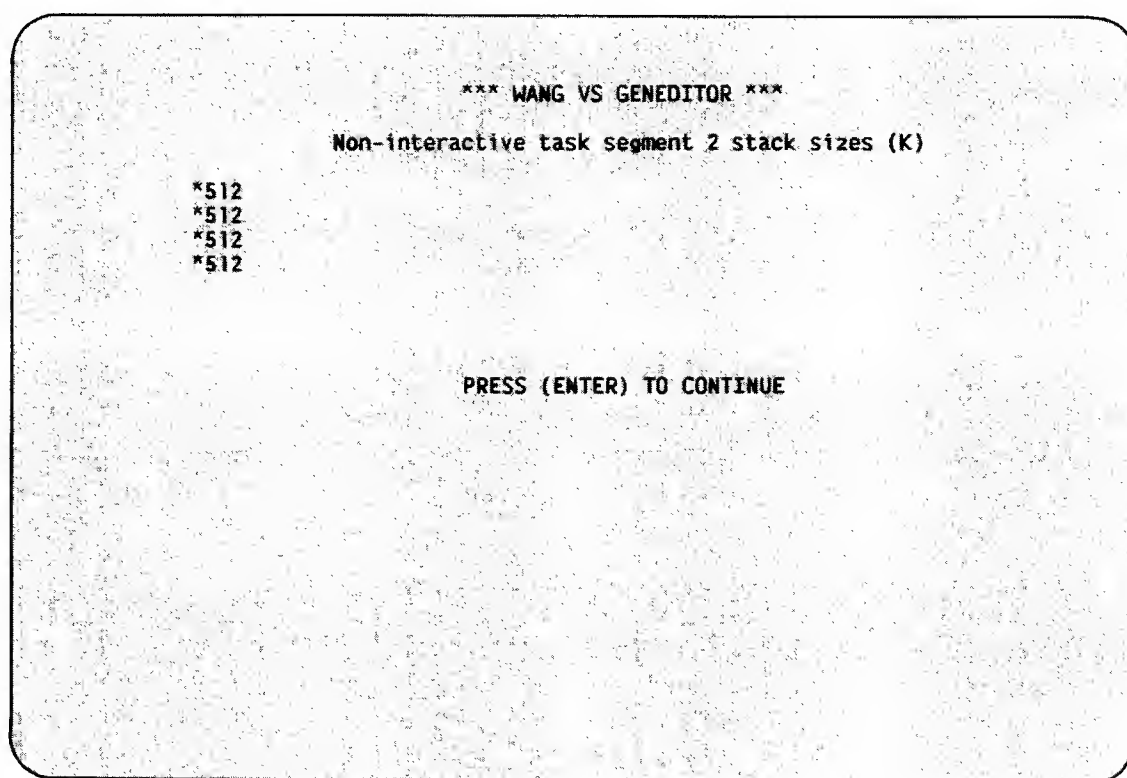
Figure 3-4. Noninteractive Task Segment 2 Sizes Screen

3.2.4 IOP Selection

The next screen allows you to specify the number and type of IOPs in the system. The screen shown in Figure 3-5 appears for CP 3 (VS80/60/50); the screen shown in Figure 3-6 appears for CP 4 (VS100/90/85).

Devices for CP 5 (VS25/45) are handled by device adapters rather than by IOPs. However, the CP 5 device adapter configuration is specified through an IOP Selection screen (Figure 3-7) similar to that used for models CP 3 and CP 4. Throughout this chapter, IOP is synonymous with device adapter when specifying device adapters and dependent devices for the VS25/45.

GENEDIT automatically displays the IOPs required to support the devices you have specified on the General Configuration screen. You can also specify additional IOPs (if there is room for them in the CPU) up to a maximum of eight IOPs on the VS80/60/50 and VS25/45, and 16 IOPs on the VS100/90/85. Note the following:

- The IOP supporting Workstation #0 always appears first in the IOP list. On the VS100, the IOP order reflects the physical position of the IOPs on the two bus adapters.

- On the VS100, the large disk IOP is always in slot 0, and therefore is always IOP 0 on the IOP list. Additional IOPs should be installed in the order of the speed of the devices connected to them. For example, disk IOPs should be in lower-numbered IOP slots than tapes, and tapes in lower-numbered slots than printers.

- The VS100 and the VS25/45 do not support any parallel devices.

```
                    *** WANG VS GENEDITOR ***

                Your general configuration minimally requires
                the following I/O processors (IOPs):

      IOP  Dev#   ID      Type

       2     0   22V07    Serial IOP
       0    16   22V08    Large Disk IOP
       1    20   22V05    Magnetic Tape IOP
       3    32   22V06-1  TC IOP (one line)
       4
       5
       6
       7
                                          Press (ENTER) to continue

                             (1)  Add     IOP      (4)  Change Dev#
                             (2)  Delete  IOP      (5)  Show IOPs
                             (3)  Change  IOP     (32) General menu
```
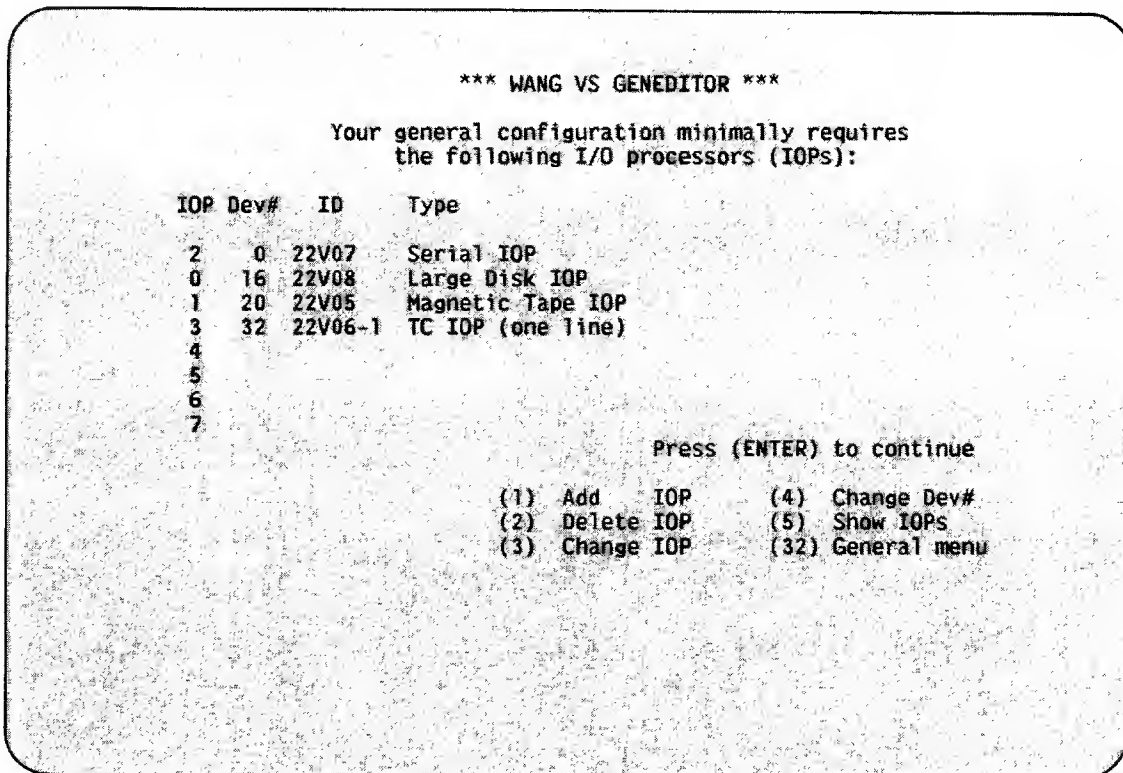
Figure 3-5.   VS80/60/50 IOP Selection Screen

3-14

You can add, delete, change, or rearrange I/O processors on the IOP Selection screen, as shown in Figures 3-5, 3-6, and 3-7. Usually, the GENEDIT program defaults to a 22V07 (serial devices) IOP as the first IOP listed for the VS80. If the system currently has a parallel workstation as device 0, press PF3 (Change IOP) and change the IOP from a 22V07 (serial) to 22V01 (parallel devices) IOP. The GENEDIT program automatically modifies the device number range from 0 through 16 (as supported by a serial IOP) to devices 0 through 4 (as supported by a parallel devices IOP). Additionally, you can press PF4 (Change Device Numbers) to modify the device number range to reflect the logical configuration. You can modify the IOPs listed on the IOP Selection screen at any time during the GENEDIT program by pressing PF2 to delete an IOP or PF3 to change an IOP. You must enter the IOPs sequentially so that the device numbers are in ascending order.

```
                      *** WANG VS GENEDITOR ***

                Your general configuration minimally requires
                     the following I/O processors (IOPs):

            BUS ADAPTER #1                           BUS ADAPTER #2
 IOP Dev#  ID    Type                   IOP Dev#   ID     Type

  2    0   22V27  Serial IOP (Extended)   0    56   22V27   Extended Serial IOP

  0   16   22V28  Large Disk IOP          1    72   22V25   Magnetic Tape IOP
  1                                       2
  3                                       3
  4                                       4
  5                                       5
  6                                       6
  7                                       7
                       Press (ENTER) to continue

                  (1)  Add    IOP      (4)  Change Dev#
                  (2)  Delete IOP      (5)  Show IOPs
                  (3)  Change IOP      (32) General menu
```

Figure 3-6. VS100/90/85 IOP Selection Screen

```
                    *** WANG VS GENEDITOR ***

                Your general configuration minimally requires
                    the following I/O processors (IOPs):

        IOP Dev#   ID      Type

         2    0   25V27    Serial Dev Adapter
         0   16   25V02    Small Disk IOP
         1   20   25V55    Fxd Disk Dev Adapter
         3   22   25V76    TC Device Adapter
         4
         5   54   25V50    Disk Device Adapter
         6
         7
                                    Press (ENTER) to continue

                        (1)  Add    IOP     (4)  Change Dev#
                        (2)  Delete IOP     (5)  Show IOPs
                        (3)  Change IOP    (32) General menu
```
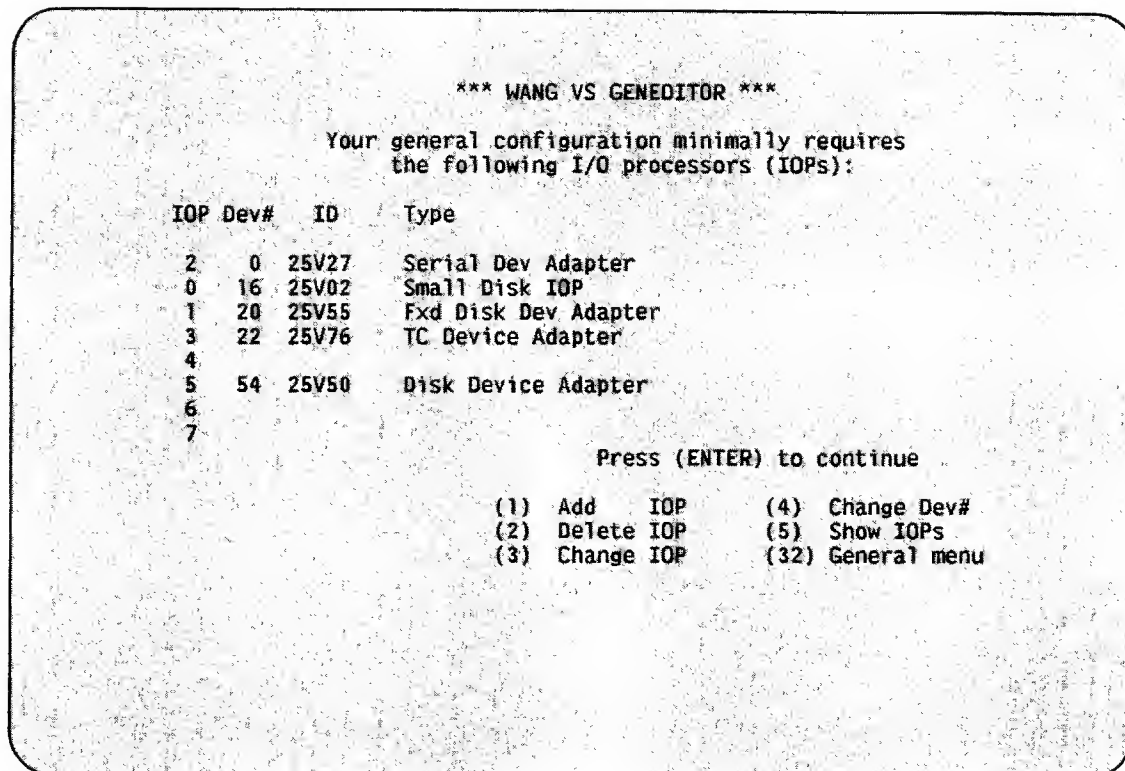
Figure 3-7.   VS25/45 IOP Selection Screen

When the IOP Selection screen (Figure 3-5, 3-6, or 3-7) is
satisfactory, press ENTER to write the desired IOP configuration to the
configuration work file. This step leads you to a series of screens
which display each IOP and its supported devices. The IOPs and dependent
devices are displayed in the same order in which they are listed on the
screens shown in Figures 3-5, 3-6, and 3-7.

Table 3-4 lists all the valid IOPs for CP models 3 and 4. Appendix A contains a list of all valid devices for each IOP (CP models 3, 4, and 5).

Table 3-4. Valid IOPs for Models CP 3 and CP 4

CP 3 IOPs (VS80/60/50)		CP 4 IOPs (VS100/90/85)	
22V01	Parallel Devices IOP	22V15-2	Advanced Magtape IOP
22V02	Small Disk IOP	22V25	Tape Drive IOP
22V05	Magnetic Tape IOP	22V26-1	TC IOP (one line)
22V06-1	TC IOP (one line)	22V26-2	TC IOP (two lines)
22V06-2	TC IOP (two lines)	22V26-3	TC IOP (three lines)
22V06-3	TC IOP (three lines)	22V27	Serial Devices
22V07	Serial Devices IOP		(Extended) IOP
22V08	Large Disk IOP	22V27I	Ideographic Serial IOP
22V08A	Limited Large Disk IOP	22V28	Large Disk IOP
22V15-1	Advanced Magtape IOP	22V28A	Limited Large Disk IOP
22V17	Serial Devices	22V47	Extended Serial IOP
	(Extended) IOP	22V48	Dual Port Disk IOP
22V17I	Ideographic Serial IOP	22V66-1	TC Device Adapter
22V18	Limited Large Disk IOP	22V66-2	TC Device Adapter
22V37	Extended Serial IOP	22V67	WangNet Controller IOP
22V38	Dual Port Disk IOP	22V88	Very Large Disk IOP
22V56-1	TC Device Adapter		
22V57	WangNet Controller IOP		
22V78	Very Large Disk IOP		

Table 3-5 lists all the valid device adapters and IOP addresses for model CP 5 (VS25/45). The default device adapters shown in Figure 3-7 are listed in ascending order by device number. However, device adapter IDs must always match the correct IOP addresses. You can modify the default parameters by adding, deleting, changing, or rearranging device adapters on the VS25/45 IOP Selection screen as long as device adapter assignments match the correct IOP addresses shown in Table 3-5.

Table 3-5. Valid CP 5 (VS25/45) Device Adapters and IOP Addresses

IOP	CP 5 Device Adapter	Description
0	25V02	Small disk (diskette) controller (default)
1	25V55	Fixed disk (34 MB) controller (default)
	25V50-0	Fixed disk (76 MB) controller
2	25V27	Serial controller (default)
	25V37	Intelligent SIO controller
	25V67	WANGBAND controller
3	25V76	TC controller (default)
4	Not assigned	
5	25V50	Cartridge Module Disk (CMD)/ Storage Module Disk (SMD) controller (default)
6	Not assigned	
7	Not assigned	

If you enter an invalid CP 5 (VS25/45) device adapter assignment, an error message is displayed on your screen so that you can correct the entry. For example, if you enter a 25V37 device adapter ID for IOP 1, the error message THIS SLOT REQUIRES HARD DISK CONTROLLER ONLY is displayed. Choose the correct fixed disk device adapter ID and modify the entry on the VS25/45 IOP Selection screen.

3.2.5 Device Selection

When you have selected IOPs for a CP 3 (VS80/60/50), a CP 4 (VS100/90/85), or a CP 5 (VS25/45), a series of screens allows you to select the dependent devices for each IOP.

The IOP device selection screens display each IOP name and dependent devices. You can modify the devices by entering different model numbers in the appropriate fields. If you are unsure of the devices supported by the IOP, press PF2 to display a list of valid device numbers on the screen, or refer to Appendix A for a printed list of valid device numbers. If you enter the number of a device not supported by the IOP, an error message is displayed. You can also press PF16 to go to the Summary menu, PF31 to return to the IOP Selection screen, or PF32 to return to the General Configuration screen.

Figure 3-8 shows a sample Serial IOP (22V07) screen. The information displayed includes the device number, the device type, a brief description of the device, the port number, and an indication that the device supports word processing (WP). The modifiable fields are device type, port number, and printer WP support (Y or N).

```
                    *** WANG VS GENEDITOR ***
                         Serial IOP #4
   Dev        Type    Description              Port     WP

   0          2246S   Serial Work Station        0
   1          2246S   Serial Work Station        1
   2          2246S   Serial Work Station        2
   3          2246C   Combined Wrk Station       3
   4          2246C   Combined Wrk Station       4
   5          2246C   Combined Wrk Station       5
   6          2246C   Combined Wrk Station       6
   7          2246C   Combined Wrk Station       7
   8          5521    200 cps Matrix Prtr        8      Y
   9          55312   120m cps Matrix Prtr       9      Y
   10         5548Z   Typesetter                10      Y
   11
   12
   13
   14
   15


                  Press (ENTER) to continue

                                          (31) IOP menu
      (2) Show valid device types  (16) Summary menu  (32) General menu
```

Figure 3-8. Serial IOP (22V07) Screen

When you are satisfied with the information displayed, press ENTER to continue to the next screen. A separate screen is displayed for each IOP in the configuration. Each screen can be modified in the same manner as the sample Serial IOP screen shown in Figure 3-8. However, only printers can be designated as supporting WP capabilities.

Several other sample IOP Selection screens are shown to serve as guides. However, on your system you encounter an IOP Device screen for each IOP listed on the IOP Selection screen.

Figure 3-9 shows a sample Small Disk IOP (22V02) screen. Notice that the 2270V0 diskette drive is listed in the last position on the IOP. It is a CP 3 system requirement that the diskette located in the CPU cabinet must be listed in the last port on the small disk IOP.

```
              ***  WANG VS GENEDITOR  ***

                   Small Disk IOP #1


        Dev      Type      Description

        20      2260V     10 Meg F/R Disk
        21
        22
        23      2270V0    Diskette




              PRESS (ENTER) TO CONTINUE

                                          (31) IOP Menu
     (2) Show valid device types  (16) Summary Menu  (32) General Menu
```
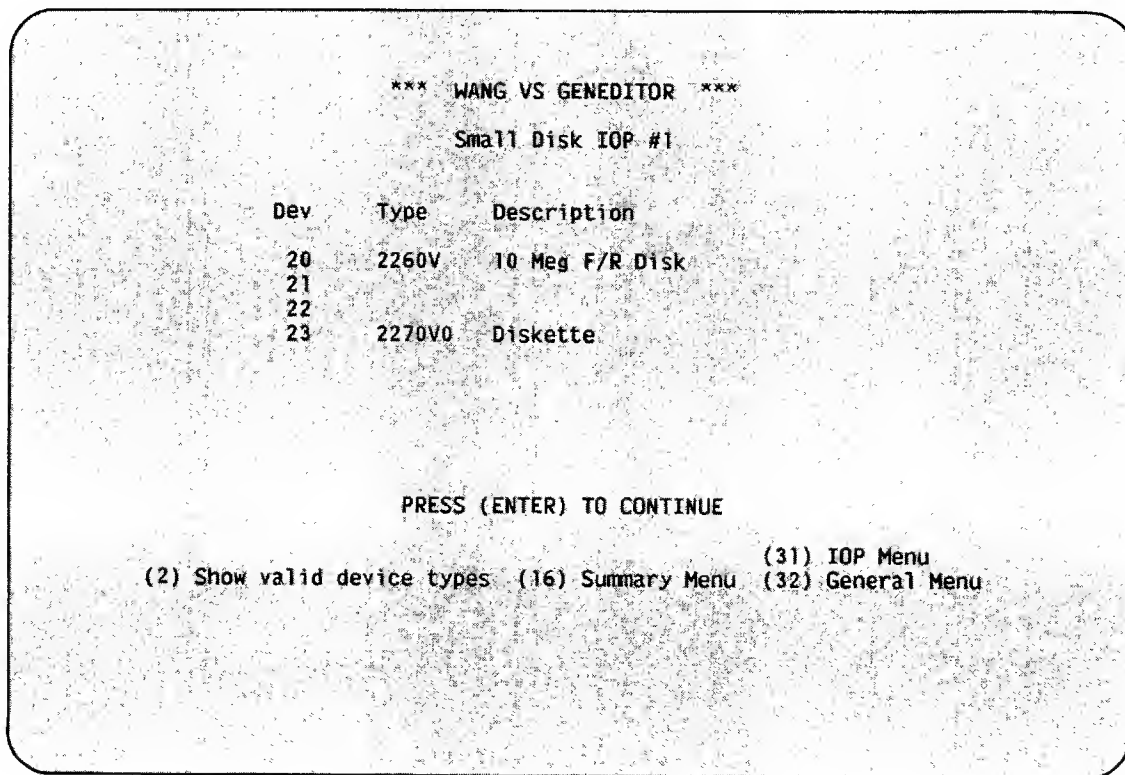
Figure 3-9. Small Disk IOP (22V02) Screen

Figure 3-10 shows a sample Large Disk IOP (22V08/22V28) screen. A variation of this screen appears for IOPs 22V78 and 22V88 (very large disk IOPs). IOPs 22V08 and 22V28 have corresponding IOPs 22V38 and 22V48 for dual port disks. However, for very large disk IOPs 22V78 and 22V88, dual port capabilities are specified on the IOP screen in a column entitled ATT (attach). Enter Y or N to indicate whether or not the disk drive should be attached to the CPU at IPL time.

```
                    *** WANG VS GENEDITOR ***



                         Large Disk IOP #0


          Dev      Type      Description          Port

           16     2280V1    30 Meg F/R Disk        0
           17     2265V1    75 Meg Rem Disk        1
           18     2265V1    75 Meg Rem Disk        2
           19     2265V2    288 Meg Rem Disk       3









                    PRESS (ENTER) TO CONTINUE


                                            (31) IOP Menu
        (2) Show valid device types  (16) Summary Menu  (32) General Menu
```

Figure 3-10. Large Disk IOP (22V08/22V28) Screen

Figure 3-11 shows a sample Serial Device Adapter screen for a CP 5 (VS25/45).

```
                    ***  WANG VS GENEDITOR  ***

                        Serial Dev Adapter #2

   Dev        Type       Description          Port   WP

    0        2246S       Serial Work Station    0
    1        2246S       Serial Work Station    1
    2        2246S       Serial Work Station    2
    3        5521        200 cps Matrix Prtr    3     N
    4        5521        200 cps Matrix Prtr    4     N
    5        5521        200 cps Matrix Prtr    5     N
    6
    7
    8
    9
   10
   11
   12
   13
   14
   15
                        Press ENTER to continue


   (2) Show valid device types                (31) IOP Menu
                              (16) Summary Menu    (32) General Menu
```

Figure 3-11.   Serial Device Adapter (25V27) Screen

When you have entered all the information concerning IOPs and the devices dependent upon them through the GENEDIT screens, the program returns to the General Configuration screen. Press ENTER to accept the screen.

At this point, if you have specified any TC devices attached to your system through the IOP device selection screens, GENEDIT displays a series of screens that allows you to enable automatic activation of remote workstations. For this procedure, see Section 3.2.6.

If you have not specified any TC devices attached to your system, continue completing the configuration file (see Section 3.2.7).

3.2.6 Remote Workstation Automatic Activation

To enable automatic activation of remote workstations, GENEDIT allows you to define the parameters for remote devices in a configuration file. When you complete the IOP device selection screens and press ENTER to accept the General Configuration screen, the Remote Workstation Auto-Activation screen, shown in Figure 3-12, is displayed. This screen asks you if you wish to define parameters for remote devices.

```
                    *** WANG VS GENEDITOR ***




          Do you wish to define parameters for
          remote workstation auto-activation?


                  REMOTEWS = NO








          or press (PF 16) to skip this option
```
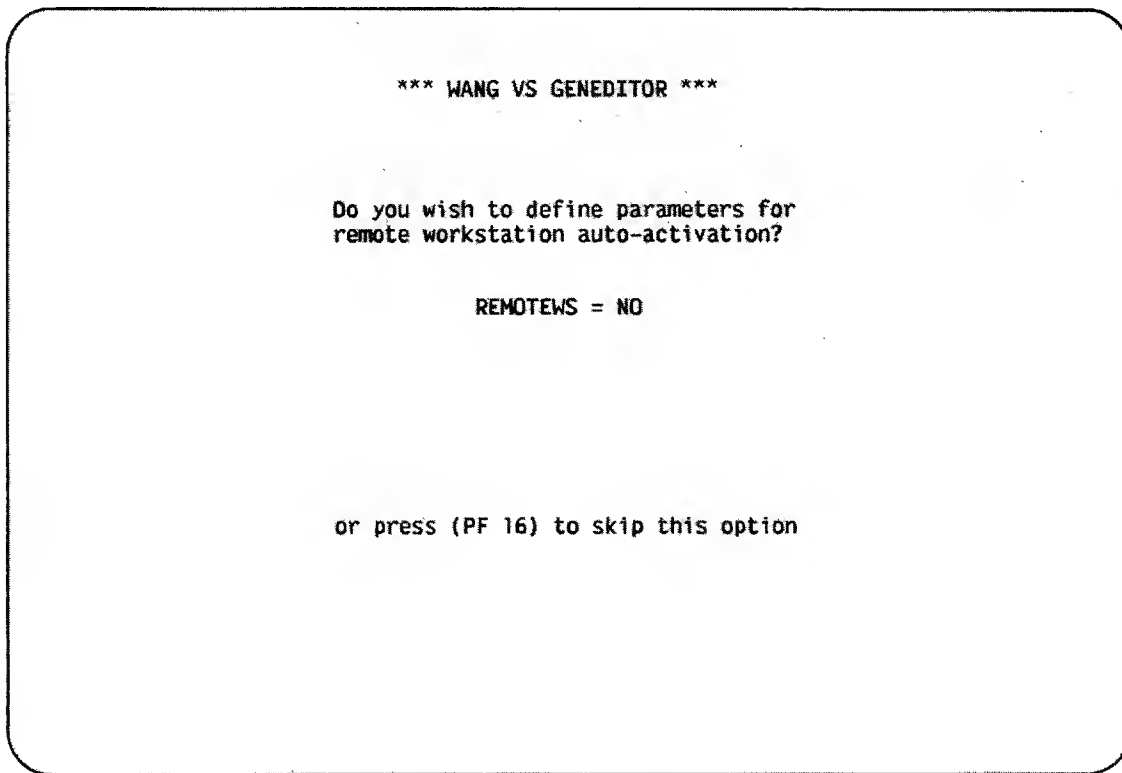
Figure 3-12. Remote Workstation Auto-Activation Screen

Press PF16 to continue without enabling automatic activation. (Refer to Section 3.2.7 to complete the configuration file.)

Enter YES and press ENTER to accept automatic activation. At this time, the following message is displayed:

Retrieving the device list for the next TC IOP. Please wait.

The TC IOP Device Selection screen, a sample of which is shown in Figure 3-13, is then displayed. This screen lists the devices that have been defined for each TC IOP and prompts you for the line name and routing address of each device. At this time, you can define a remote device as a generic TC device to prevent activation of it, or you can specify a valid device type along with the line name and routing address necessary to activate it. Remote devices must be defined as valid device types and given line names (usually remote site locations) and routing addresses for automatic activation to take place at IPL time. Press PF2 to display a list of all valid TC IOP device types.

```
                    *** WANG VS GENEDITOR ***


                              IOP # 3
                         on Bus Adapter # 2
                         is a TC IOP (two lines)


        Dev     Type     Description        Port   Line Name   Routing Address
        42      TC       Batch TC            0                  0   (0-31)
        43      TC       Batch TC            0                  0
        44      4220R    Bisync Remote WS    1      BOSTON      5
        45      2246R    Remote Work Station 1      BOSTON      5




        Select:
        (2) Show Valid Device Types
        (ENTER) Continue to next IOP                      (16) Return
```
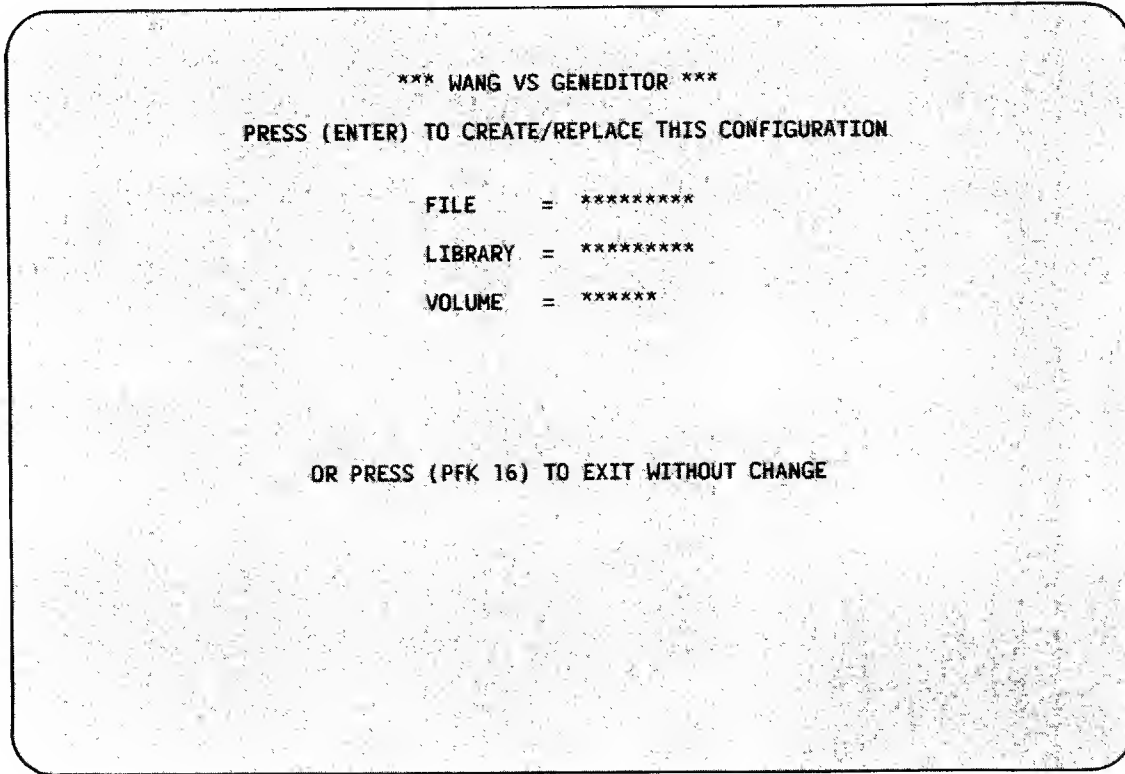
Figure 3-13. TC IOP Device Selection Screen

When you are satisfied with the information displayed, press ENTER to continue with the GENEDIT procedure for completing the configuration file (see Section 3.2.7).

3.2.7 Replace/Create Configuration File

When you have defined dependent devices and accepted the General Configuration screen, the system displays a completed Replace/Create Configuration File screen similar to the one shown in Figure 3-14.

```
                    *** WANG VS GENEDITOR ***

        PRESS (ENTER) TO CREATE/REPLACE THIS CONFIGURATION


                      FILE    =  ********

                      LIBRARY =  ********

                      VOLUME  =  ******




              OR PRESS (PFK 16) TO EXIT WITHOUT CHANGE
```

Figure 3-14.   Replace/Create Configuration File Screen

If you are editing an existing file, the screen shown in Figure 3-14 allows you to replace the old configuration file with the new one. If you are creating a new file, enter the new file name, library, and volume and then press ENTER. GENEDIT responds with the message "File Creation in Progress." When the file is successfully created, GENEDIT returns to the Configuration File Specification screen. If you are replacing an existing configuration file and renaming the file, enter the name of the file on the screen shown in Figure 3-14. The system displays the Correction screen shown in Figure 3-15 to inform you that you are revising an existing file.

```
                    *** MESSAGE R040 BY OPEN

                    CORRECTION REQUIRED BY PROGRAM GENEDIT
                              TO DEFINE OUTPUT

      THE FILE SPECIFIED BELOW ALREADY EXISTS.
      USE PF3 IF YOU WISH TO SCRATCH THE EXISTING FILE AND CONTINUE
      OTHERWISE, PLEASE SPECIFY ANOTHER FILE NAME.

      PLEASE ASSIGN "OUTPUT"  (TO BE CREATED AS OUTPUT BY THE PROGRAM)

      TO ASSIGN THIS FILE TO A DISK FILE, PLEASE SPECIFY:

      FILE =              IN LIBRARY =          ON VOLUME =
      RECORDS =              RETAIN  =   DAYS    RELEASE   =
      FILECLAS=
      DEVICE  =
```

Figure 3-15. Correction Screen

     Press PF3 to replace the existing file with the newly revised one or
enter a new file name. The system then displays the Configuration File
Specification screen (Figure 3-1) again. At this point you can choose to
create additional configuration files, edit existing files, or press PF16
to return to the VS Command Processor menu.

APPENDIX A
GENEDIT TABLES

Table A-1. VS80/60/50 Valid IOPs and Supported Devices

VS IOP	Type of IOP	Devices Supported
22V01	Parallel Devices	2246P Parallel Workstation 2221V 200 cps Matrix Printer 2231V2 120 cps Matrix Printer 2263V1 300 lpm Train Printer 2263V2 600 lpm Train Printer 2263V3 430 lpm Train Printer 2281V 30 cps Daisy Printer
22V02	Small Disk	2260V 10 MB Fixed/Removable Disk Drive 2270V0 Diskette Drive
22V05	Magnetic Tape	2209V 9-Track, 1600 bpi Tape Drive 2209V2 9-Track DD, 800/1600 bpi Tape Drive 2209V3 7-Track, 556/800 bpi Tape Drive
22V06-1	TC IOP (one line)	2246R Remote Workstation 2246RK Remote Katakana Workstation 4420R Binary Synchronous Remote Workstation 2221V 200 cps Matrix Printer 2231V2 120 cps Matrix Printer 2233 100 lpm Remote Matrix Printer 2235 180 lpm Remote Matrix Printer 2233K 100 lpm Katakana Printer 2235K 180 lpm Katakana Printer 2263V1 300 lpm Train Printer 2263V2 600 lpm Train Printer 2263V3 430 lpm Train Printer 2273V1 250 lpm Remote Band Printer 2281V 30 cps Daisy Printer 2281WR Remote Daisy Printer 2281WCR Wide Carriage Remote Printer

(continued)

A-1

Table A-1. VS80/60/50 Valid IOPs and Supported Devices (continued)

VS IOP	Type of IOP	Devices Supported
22V06-1 (cont.)	TC IOP (one line)	DWR20 20 cps Remote Daisy Printer TC Batch TC
22V06-2	TC IOP (two lines)	All devices supported by the 22V06-1
22V06-3	TC IOP (three lines)	All devices supported by the 22V06-1
22V07	Serial Devices	2246S Serial Workstation 2246C Combined Workstation 2246K Katakana Workstation 2246SI Ideographic Serial Workstation 2246SIJ Serial Ideographic Japanese Workstation 2246SCD Cash Drawer Workstation 2246S1 029 Standard Keypad WS (2246D) 2246S2 Reversed Numeric Keypad WS 2246S2B 32K Serial Workstation 2246S3 029 Reversed Numeric Keypad WS 2256C 64K Combined Workstation 4205 32K Data Processing Workstation 4210MW Mono Workstation 4210NL 32 Line Workstation 4230 64K Mono Combined Workstation 4230A 64K English/Arabic Workstation 2529V 6400 bpi Cartridge Tape 5521 200 cps Matrix Printer 5521I 200 cps Ideographic Matrix Printer 5521IK 200 cps Ideographic Katakana Matrix Printer 5521K 200 cps Katakana Matrix Printer 55312 120 cps Matrix Printer 55312K 120 cps Katakana Matrix Printer 5533 100 cps Matrix Printer 5535 180 cps Matrix Printer 5548Z Phototypesetter 5570 600 lpm Train Printer 5571 430 lpm Train Printer 5573 250 lpm Band Printer 5574 600 lpm Band Printer 5575 Hi-Speed (1100 lpm) Band Printer 5577 High-Density Matrix Printer 5581WD Dual-Head Daisy Printer 6581W 40 cps Daisy Printer 6581WC 40 cps Wide Daisy Printer

(continued)

Table A-1. VS80/60/50 Valid IOPs and Supported Devices (continued)

VS IOP	Type of IOP	Devices Supported
22V07 (cont.)	Serial Devices	6300GM Graphic Mono WP Workstation 6300GM2 Graphic Mono WP Workstation DWOS55 55 cps Daisy Printer DWOS20 20 cps Daisy Printer LPS12 Laser Printer
22V08	Large Disk	2265V1 75 MB Removable Disk Drive 2265V2 288 MB Removable Disk Drive 2280V1 30 MB Fixed/Removable Disk Drive 2280V2 60 MB Fixed/Removable Disk Drive 2280V3 90 MB Fixed/Removable Disk Drive
22V08A	Limited Large Disk	2280V1 30 MB Fixed/Removable Disk Drive
22V15-1	Advanced Magtape	2219V1 1600/6250 bpi, 75 ips Tape Drive 2219V2 1600/6250 bpi, 125 ips Tape Drive 2219V3 Tri-Density, 75 ips Tape Drive 2219V4 Tri-Density, 125 ips Tape Drive
22V17	Serial Devices (Extended)	All devices supported by the 22V07 Serial Devices IOP plus the following devices: 22460 Okidata Workstation 2246SDB Autodial Workstation 2266C Combined Archiving Workstation 2266S Serial Archiving Workstation 2276C 64K Combined Archiving Workstation 2270V1 Hard Sector Archiving Diskette Drive 2270V2 Soft Sector Archiving Diskette Drive 2270V3 Hard/Soft Sector Archiving Diskette Drive BIZDIAL BIZCOMP Autodial Modem CIU OK555 Okidata Matrix Printer TCB1 TCB3

(continued)

Table A-1. VS80/60/50 Valid IOPs and Supported Devices (continued)

VS IOP	Type of IOP	Devices Supported
22V17I	Ideographic Serial IOP	All devices supported by the 22V17 Serial Devices IOP plus the following devices: 2246SID Ideographic Dictionary Serial Workstation 2246SJD Japanese Dictionary Serial Workstation IDD01 Ideograghic RAM Dictionary TPI-1 Toshiba Printer
22V18	Limited Large Disk	2280V1 30 MB Fixed/Removable Disk Drive
22V37	Extended Serial IOP	All devices supported by the 22V17 Serial Devices IOP
22V38	Dual Port Disk IOP	All devices supported by the 22V08 Large Disk IOP plus the following devices: 2265V1A 75 MB Dual Port Removable Disk Drive 2265V2A 288 MB Dual Port Removable Disk Drive
22V56-1	TC Device Adapter	TC2 Batch TC
22V57	WangNet Controller IOP	All devices supported by the 22V37 Extended Serial IOP plus the following devices: 5200 WangNet Combined Workstation 5200A WangNet Audio Workstation 5300 WangNet Combined Workstation 5300A WangNet Audio Workstation
22V78	Very Large Disk IOP	All devices supported by the 22V38 Large Disk IOP plus the following devices: 2265V3 620 MB Fixed Disk Drive 2265V3A 620 MB Dual Port Disk Drive

Table A-2. VS100/90/85 Valid IOPs and Supported Devices

VS IOP	Type of IOP	Devices Supported
22V15-2	Advanced Magtape	2219V1 1600/6250 bpi, 75 ips Tape Drive 2219V2 1600/6250 bpi, 125 ips Tape Drive 2219V3 Tri-Density, 75 ips Tape Drive 2219V4 Tri-Density, 125 ips Tape Drive
22V25	Tape Drive	2260V 10 MB Fixed/Removable Disk Drive 2270V0 Diskette
22V26-1	TC (one line)	All devices supported by the 22V06-1
22V26-2	TC (two lines)	All devices supported by the 22V06-1
22V26-3	TC (three lines)	All devices supported by the 22V06-1
22V27	Serial Devices (Extended)	Same devices supported as 22V17 Serial Devices (Extended) IOP on VS80/60/50
22V27I	Ideographic Serial IOP	All devices supported by the 22V17I Ideographic Serial IOP
22V28	Large Disk	Same devices supported as 22V08 Large Disk IOP on VS80/60/50
22V28A	Limited Large Disk IOP	2280V1 30 MB Fixed/Removable Disk Drive
22V47	Extended Serial IOP	All devices supported by the 22V37 Extended Serial IOP
22V48	Dual Port Disk IOP	All devices supported by the 22V38 Dual Port Disk IOP
22V66-1	TC Device Adapter	TC3 Batch TC
22V67	WangNet Controller IOP	All devices supported by the 22V57 WangNet Controller IOP
22V88	Very Large Disk IOP	All devices supported by the 22V38 Dual Port Disk IOP plus the following devices: 2265V3 620 MB Fixed Disk Drive 2265V3A 620 MB Dual Port Disk Drive

Table A-3. VS25/45 Valid IOPs (Device Adapters) and Supported Devices

VS IOP	Type of IOP	Devices Supported
25V02	Small Disk	2270V4 Diskette
25V27	Serial Devices	2246S Serial Workstation 2246S2B 32K Serial Workstation 2246SCD Cash Drawer Workstation 2246SDB Autodial Workstation 2246SIJ Ideographic Japanese Serial Workstation 2246S1 029 Standard Keypad Workstation 2246S2 Reversed Numeric Keypad Workstation 2246S3 029 Reversed Numeric Keypad Workstation 2246C Combined Workstation 2246K Katakana Workstation 2246O Okidata Workstation 2256C 64K Combined Workstation 2266C Combined Archiving Workstation 2266S Archiver Serial Workstation 2266SI Ideographic Serial Workstation 2276C 64K Combined Archiving Workstation 4205 32K Data Processing Workstation 4210MW Mono DP Workstation 4210NL 32 Line Workstation 4230 64K Mono Combined Workstation 4230A 64K English/Arabic Workstation 6300GM2 Graphic Mono WP Workstation 6300GM Graphic Mono WP Workstation 2270V1 Hard Sector Archiving Diskette Drive 2270V2 Soft Sector Archiving Diskette Drive 2270V3 Hard/Soft Sector Archiving Diskette Drive 2509V 9-Track, 1600 bpi Tape Drive 2529V 6400 bpi Cartridge Tape Drive 5521 200 cps Matrix Printer 5521I 200 cps Ideographic Matrix Printer 5521K 200 cps Katakana Matrix Printer 5521IK 200 cps Ideographic Katakana Matrix Printer 55312 120 cps Matrix Printer 55312K 120 cps Katakana Matrix Printer

(continued)

VS IOP	Type of IOP	Devices Supported
25V27	Serial Devices	5533 100 cps Matrix Printer 5535 180 cps Matrix Printer 5548Z Phototypesetter 5570 600 lpm Chain Printer 5571 430 lpm Chain Printer 5573 250 lpm Band Printer 5574 600 lpm Band Printer 5575 Hi-Speed 1100 lpm Band Printer 5577 High Density Matrix Printer 5581WD Dual-Head Daisy Printer 6581W 40 cps Daisy Printer 6581WC 40 cps Wide Daisy Printer BIZDIAL BIZCOMP Autodial Modem CIU CIU Device DWOS20 20 cps Daisy Printer DWOS55 55 cps Daisy Printer LPS12 Laser Printer OK555 Okidata Matrix Printer TCB1 Device TCB3 Device
25V37	Intelligent SIO	All devices supported by the 25V27 Serial Devices (Extended) IOP plus the following device: 2509V 9-Track Tape Drive
25V50	Disk Devices	2265V1 75 MB Removable Disk Drive 2265V2 288 MB Removable Disk Drive 2265V3 620 MB Fixed Disk Drive 2280V1 30 MB Fixed/Removable Disk Drive 2280V2 60 MB Fixed/Removable Disk Drive 2280V3 90 MB Fixed/Removable Disk Drive
25V50-0	8-Inch Fixed Disk	2220 76 MB Fixed Disk
25V55	8-Inch Fixed Disk	Q2040 34 MB Fixed Disk
25V67	WANGBAND Controller	All devices supported by the 25V27 and the 25V37, plus the following devices: 5200 WangNet Combined Workstation 5200A WangNet Audio Workstation 5300 WangNet Combined Workstation 5300A WangNet Audio Workstation
25V76	TC Devices	TC4 Batch TC 4220R Binary Synchronous Remote Workstation

APPENDIX B
GENEDIT ERROR MESSAGES

This appendix contains an alphabetical listing of all the GENEDIT error messages, along with a suggested resolution for each error.

2270V ALLOWED IN LAST SLOT ONLY
    Delete the current device number and enter 2270V0 as the last device number on the 22V02 Small Disk IOP Selection screen.

AT LEAST TWO DISKS ARE REQUIRED
    You must specify at least two disks on the General Configuration screen.

COUNT EXCEEDS MAXIMUM
    Only a certain number of IOPs are allowed to be configured; you have entered more IOPs than are allowed. Return to the IOP Selection screen and reduce the number of IOPs requested.

DEVICE ZERO MUST BE A WORKSTATION
    You have selected a device other than a workstation as Device 0. Return to the Device Selection screen and enter a workstation as Device 0.

DISK IOP MAY NOT BE DELETED
    The system requires at least one IOP for disk drives. You cannot delete the disk IOP from the IOP Selection screen.

DISK IOP REQUIRED
    Enter at least one disk IOP in the IOP Selection screen.

INVALID DEVICE COMBINATION ON PORT xx
    You have entered two or more devices that cannot be configured together on port xx. Return to the IOP Device screen and delete one of the devices.

INVALID DEVICE TYPE
    You have entered a nonexistent device number. Press PF2 from the appropriate Device Selection screen; a list of valid device types will be displayed for the IOP. Enter a correct device on the Device Selection screen.

INVALID IOP STARTING DEVICE# --
MODULO (nnn) REQUIRED
    The number you specified to reset the starting IOP device number is
    an incorrect multiple. Enter a number that is a multiple of nnn.

INVALID IOP STARTING DEVICE# --
MUST EQUAL OR EXCEED (nnn)
    The number you entered to reset the starting device number on the IOP
    was too low. The minimum acceptable device number is nnn. Enter an
    acceptable value.

INVALID IOP STARTING DEVICE# --
 = REQUIRED
    The starting device number cannot exceed the number shown. Enter a
    number less than or equal to the number indicated in the error
    message.

INVALID IOP TYPE
    You have specified an invalid IOP. Press PF5 from the IOP Selection
    screen for a list of valid IOPs; enter a value from the list of
    acceptable IOPs.

INVALID OPTION
    Only Y (Yes) or N (No) can be entered.

IOP COUNT EXCEEDS MAXIMUM
    Check the actual (physical) configuration and select only necessary
    IOPs.

IOP COUNT LESS THAN MINIMUM (2)
    Specify at least two IOPs.

IPL DISK IOP REQUIRED
    Select at least one disk IOP for an IPL disk.

IOP DOES NOT SUPPORT THIS DEVICE
    You have selected a device that is not supported by the specified
    IOP. Press PF2 from the appropriate Device Selection screen; the
    system will display a list of valid device types for the IOP.

IOP SUPPORTS ONLY XX PORTS (INCREASING FROM 00)
    You entered an invalid port number. Port numbers must be within the
    range specified by the error message.

NO ADDITIONAL IOP POSSIBLE
    Check the actual (physical) configuration and select only necessary
    IOPs.

NO IOP ELIGIBLE FOR DELETION
    The system is already at minimum IOP requirements. Either add IOPs
    or press PF32 and return to the General Configuration screen.

NON-DISK IOP MAY NOT PRECEDE DISK IOP
    Check the actual (physical) configuration and select IOPs in the
    correct order.

NON-INTERACTIVE TASK COUNT EXCEEDS MAXIMUM
    You have entered a number higher than the allowable maximum for the
    Non-Interactive Task parameter. Enter a number within the allowed
    range.

(iotype) NOT SUPPORTED WITH (iotype)
    You have selected two iotypes that cannot both be supported on the
    same configuration. Return to the IOP Selection screen and delete
    one of the IOPs named in the error message.

ONE OR MORE DEVICES REQUIRED ON THIS IOP
    You have not entered any devices for a specific IOP, yet the system
    requires at least one device. Select one or more valid devices for
    this IOP.

ONE OR MORE DISKS REQUIRED
    Enter at least one disk drive on the General Configuration screen.

ONE OR MORE WORKSTATIONS REQUIRED
    Select at least one workstation on the General Configuration screen.

THE ROUTING ADDRESS MUST BE BETWEEN 0 AND 31
    You have specified a routing address out of this range. Choose a
    routing address which corresponds to the remote workstation's
    power-up screen.

WORKSTATION COUNT EXCEEDS MAXIMUM
    You have selected more workstations than the system can support.
    Reduce the number of workstations selected.

WORKSTATION 0 IOP MAY NOT BE DELETED
    The system requires at least one serial or parallel IOP for
    workstations. You may not delete all workstation IOPs.

WORKSTATION 0 IOP REQUIRED
    Select at least one parallel or serial IOP for a workstation.

APPENDIX C
VS25/45 DIAGNOSTIC ERROR CODES

The VS25/45 computer is designed for ease of use in a wide variety of applications. Power-up diagnostic tests are part of the design. Diagnostic error codes inform you when to take corrective action and what information to relay to your Wang Field Service Representative.

If an error message occurs, copy down the numbers displayed on the four-LED panel; this information allows the Wang Customer Engineer to take the appropriate corrective action.

A listing of the diagnostic tests and error codes follows. A few of these error codes tell you how to avoid subsequent occurrences of the error. Some messages, such as the self-test monitor messages numbered from 4200 through 44FF (in hexadecimal notation), may provide useful information to the system administrator. You should record all messages and forward them to your Wang Customer Engineer.

Table C-1 is indexed by the upper two hexadecimal digits that are displayed on the VS25 front panel.

Table C-1. Diagnostic Error Code Summary

When the top 2-digit LED reads:	Record the following information for Wang Field Service:
00	Bus Processor (PROM) and BP Operational Code
10	Bus Processor
20	Bus Processor
30	Bus Processor
40	Diagnostic Monitor
41	First Boot File
42	Self Test
43	Self Test
44	System Loader
45 to 49	Diagnostic Monitor and Files
4A	Unused
4B	CPU Control Memory
4C	CPU Self-Test
4D	CPU Random Test
4E	CPU Main Memory
4F	BP DMA and MARS
50	Fixed Disk DA
60	Fixed Disk DA
70	Serial I/O DA
80	Floppy Disk Controller
90	Device Error
90	Workstation 0
92 to 94	Unused
95	Fixed Disk Device
96 to 97	Unused
98	Floppy Disk Device
99 to 9A	Unused
9B	SMD Disk Device
9C to 9F	Unused
A0	Motherboard Signal
A0 to A3	Unisolated
A4 to A7	SIO Signal
A8 to AB	Fixed Disk Signal
AC to AF	SMD Disk Signal
B0	SMD Disk DA
C0	Invalid Error Code
D0	Invalid Error Code
E0	BP Operational Code
F0	BP Operational Code

A list of four-digit test/error code (EC) numbers follows. An X, as in 41X9, stands for any hexadecimal digit.

Test / EC #   Test Title / Error Code Description

00   (No error; normal operation)
0000   8086 not running

00E0   Unable to load code to workstation 0. (Power the
                       workstation on and off to attempt to clear the
                       condition.)
00E1   Main memory parity error occurred during a code RAM DMA.
00E2   Main memory DMA attempted to access a nonexistent address.
00E3   BP DATA RAM parity error has occurred.
00E4   The front panel system disk selector switch is wrong.
00E5   A Pascal exception of unknown origin has occurred.
00E6   An invalid DA type value has been detected.
00E7   DMA operation between DATA RAM and main memory timed out.
00E8   The CP set an illegal command out area code.
00E9   Repeated DMA attempts for the command out area failed. BP
                       initiates entry into Control mode.
00EA   Repeated DMA attempts for the processor interrupt area
                       failed. BP initiates entry into Control mode.
00EB   An SIO/CIO raced with an EC or NC IOSW (possible OS
                       failure). BP initiates entry into Control mode.
00EC   An IRQ/DAR raced with an EC or NC ISOW (possible OS
                       failure). BP initiates entry into Control mode.
00ED   Main memory error correction count exceeded its limit
                       (e.g., 1). BP initiates entry into Control mode.

00F3   Invalid IPL device PDA received from diagnostics.
00F4   The IPL device returned damaged status (hardware error).
00F5   The IPL device was not ready (intervention required).
00F6   BP memory or disk address error while accessing IPL device.

01   PROM POWER ON
0100   BP code hung on jump to routine start.
0102   BP code hung when wait state generator set.

02   PROM CHECKSUM
0201   BP PROM Checksum error.

04   I/O COMMUNICATION CHECK
0401   BP cannot access I/O address 4 (DMAR).

06   INTERRUPT CONTROLLER
0600   BP routine halted, unknown cause
0601   BP 8259 mask not readable on master   SI = Mask pattern
0602   BP 8259 mask not readable on slave 4 SI = Mask pattern
0603   BP 8259 mask not readable on slave 3 SI = Mask pattern
0604   BP 8259 mask not readable on slave 2 SI = Mask pattern
0605   BP 8259 mask not readable on slave 1 SI = Mask pattern

```
Test / EC #        Test Title / Error Code Description

08                 PROGRAMMABLE INTERVAL TIMER #1
0800               BP routine halted, unknown cause
0801               BP data miscompare on PIT count read  SI = Exp, DI=Rcvd
0802               BP PIT counter 0 incorrect
                     CX = Received count; Expected = 024h to 04Ch
0803               BP PIT counter 1 incorrect
                     CX = Received count; Expected = 0124 to 014Ch
0805               No BP PIT interrupt request
0806               BP PIT interrupt level incorrect

09                 PROGRAMMABLE INTERVAL TIMER #2
0900               BP routine halted, unknown cause
0901               BP data miscompare on PIT count read  SI=EXP, DI=Rcvd
0902               BP PIT counter 0 incorrect
                     CX = Received count, Expected = 024h to 04Ch
0903               BP PIT counter 1 incorrect
                     CX = Received count, Expected = 124h to 14Ch
0904               BP PIT counter 2 incorrect
                     CX = Received count, Expected = 224h to 24Ch
0905               No BP PIT interrupt request
0906               BP PIT interrupt level incorrect

0A                 RAM COMMUNICATION CHECK
0A01               BP parity error cannot be cleared
0A02               BP RAM address 0 cannot be accessed
0A03               BP RAM low-byte parity error cannot be forced
0A04               BP RAM high-byte parity error cannot be forced
0A05               BP DATA RAM not available  BX = DRAM status
                     1600h = DRIO active      1500h = DRI1 active
                     1400h = DRI2 active      1300h = DRI3 active
                     1200h = DRI4 active      1100h = DRI5 active
                     1000h = DRI6 active      1F00h = MM-DRI active
                     Other = Multiple requests
0A06               BP RAM low byte parity error cannot be cleared
0A07               BP RAM high byte parity error cannot be cleared

0C                 RAM AND PARITY RAM DATA LINE TEST
0C00               BP routine halted, unknown cause
0C01               BP RAM data miscompare
0C02               Unexpected BP PE, Address = DS:BX, Main RAM data = SI
0C03               BP RAM data miscompare
0C04               Forced BP PE not detected

0E                 RAM ADDRESS LINES TEST
0E00               BP routine halted, unknown cause
0E01               BP RAM data miscompare
0E02               Unexpected BP parity error
0E03               BP RAM chip addressing error
0E04               BP parity RAM chip addressing error
```

Test / EC #	Test Title / Error Code Description
0F	BANK ADDRESSING TEST
0F01	Data error Bank Address read
0F02	Parity error Bank Address read
0F03	Data error Bank Address read
0F04	Parity error Bank Address read
10	RAM INTEGRITY TEST, WORD OPERATIONS
1000	BP routine halted, unknown cause
1001	BP RAM data miscompare, pattern B6DB
1002	Unexpected BP PE, pattern B6DB
11	RAM INTEGRITY TEST, WORD OPERATIONS
1101	BP RAM data miscompare, pattern B6DB
1102	Unexpected BP PE, pattern B6DB
1103	BP RAM data miscompare, pattern 6DB6, first read
1104	Forced BP PE low byte not detected
12	RAM INTEGRITY TEST, LOWER BYTE OPERATIONS
1201	BP RAM data miscompare, pattern 6C low byte
1202	Unexpected BP PE, pattern 6C, low byte
13	RAM INTEGRITY TEST, UPPER BYTE OPERATIONS
1301	BP RAM data miscompare, pattern DB, high byte
1302	Forced BP PE not detected, pattern DB, high byte
14	RAM BLOCK MOVE OPERATIONS and NOISE SENSITIVITY TEST
1403	BP RAM data miscompare, 0 in bank of 1s, low address
1404	BP RAM data miscompare, 0 in bank of 1s, high address
15	C-RAM DATA INVERSION
1501	BP RAM parity error
16	CODE RAM REFRESH TEST
1601	Data error on initial write/read
1602	Parity error on initial write/read
1603	Data error on read after REFRESH
1604	Parity error on read after REFRESH
18	MEMORY TO MEMORY DMA TEST
1801	DMA Chip STATUS register not zero after MASTER CLEAR
1802	Cannot access Address Register 0
1803	Address data not returning properly
1804	Internal addressing on DMA chip bad
1805	Data error after Mem-to-Mem DMA
1806	No TC when doing a Mem-to-Mem DMA
20	PARITY ERROR INTERRUPT TEST
2000	BP routine halted, unknown cause
2001	BP CODE RAM PE interrupt not detected
2002	BP DATA RAM PE interrupt not detected

Test / EC #	Test Title / Error Code Description
22	WAIT STATE GENERATOR TEST
2200	BP routine halted, unknown cause
2201	BP CODE RAM wait states cannot be changed
2202	BP PROM, I/O wait states cannot be changed
3C	MODEM LOOPBACK SELF TEST
3C01	8251, 8251 input line
3C02	8251, C/D or data line, clock, modem
3C03	I/O decode logic, inverter
3C04	8251, modem
3C05	8251
3C06	8251, buffer or modem
3C07	8251, buffer, modem
3C08	8251, buffer, modem
3C09	8251, buffer, modem
3C0A	8251, modem
3C0B	8251
3C0C	8251, modem
3C0D	8251
3C2C	Local/Remote switch or buffer
38	FLOPPY POWER-UP TEST
380A	FDC not ready for commands after reset
380B	FDC error on sense drive status command
380C	FDC error on recalibrate command
380D	Not at track 0 after recalibrate command
9820	Floppy drive not ready
9821	Error on seek to track 77
9822	Drive will not recalibrate
3E	UNEXPECTED INTERRUPT HANDLER
3EXX	Unexpected BP interrupt; XX = interrupt type serviced
3EFF	Unexpected BP interrupt; the interrupt type is unknown
40	LOAD BOOTSTRAP FILE
4000	Hung during bootstrap operation
4010	Bad volume label read (SMD)
4011	SMD media error
4012	Disk controller error (SMD)
4014	Drive not ready (SMD)
4018	Program error / media error (SMD)
401A	Nonbootstrap volume
401C	Bad file load / checksum error (SMD)
4020	Bad volume label read (FLOPPY)
4021	Media error (FLOPPY)
4022	Disk controller error (FLOPPY)
4024	Drive not ready (FLOPPY)
4028	Program error / media error (FLOPPY)
402A	Nonbootstrap volume (FLOPPY)
402C	Bad file load / checksum error (FLOPPY)

Test / EC #	Test Title / Error Code Description
40	LOAD BOOTSTRAP FILE
4030	Bad volume label read (QTM)
4031	Media error (QTM)
4032	Disk controller error (QTM)
4034	Drive not ready (QTM)
4038	Program error / media error (QTM)
403A	Nonbootstrap volume (QTM)
403C	Bad file load / checksum error (QTM)
4040	Bad volume label read (FIXED SMD)
4041	Media error (FIXED SMD)
4042	Disk controller error (FIXED SMD)
4044	Drive not ready (FIXED SMD)
4048	Program error / media error (FIXED SMD)
404A	Nonbootstrap volume (FIXED SMD)
404C	Bad file load / checksum error (FIXED SMD)
404E	Fixed disk not found in system
4090	Bad volume label read (SMD)
4091	Media error (SMD)
4092	Disk controller error (SMD)
4094	Drive not ready (SMD)
4098	Program error / media error (SMD)
409A	Nonbootstrap volume (SMD)
409C	Bad file load / checksum error (SMD)
40A0	Bad volume label read (FLOPPY)
40A1	Media error (FLOPPY)
40A2	Disk controller error (FLOPPY)
40A4	Drive not ready (FLOPPY)
40A8	Program error / media error (FLOPPY)
40AA	Nonbootstrap volume (FLOPPY)
40AC	Bad file load / checksum error (FLOPPY)
40B0	Bad volume label read (QTM)
40B1	Media error (QTM)
40B2	Disk controller error (QTM)
40B4	Drive not ready (QTM)
40B8	Program error / media error (QTM)
40BA	Nonbootstrap volume (QTM)
40BC	Bad file load / checksum error (QTM)
40C0	Bad volume label read (FIXED SMD)
40C1	Media error (FIXED SMD)
40C2	Disk controller error (FIXED SMD)
40C4	Drive not ready (FIXED SMD)
40C8	Program error / media error (FIXED SMD)
40CA	Nonbootstrap volume (FIXED SMD)
40CC	Bad file load / checksum error (FIXED SMD)

Test / EC #	Test Title / Error Code Description	
41	BOOTSTRAP LOADER	
4110	Unlabeled volume (VOL1 Missing)	Volume Label
4111	Media error	Volume Label
4112	Controller H/W error	Volume Label
4114	Drive not ready	Volume Label
4116	Program error (Divide)	Volume Label
4118	Program error (Bad Data)	Volume Label
4119	Media error	Bit Map
411A	Controller H/W error	Bit Map
411C	Drive not ready	Bit Map
411E	Program error (Divide)	Bit Map
4120	Program error (Bad Data)	Bit Map
4121	Media error	VTOC
4122	Controller H/W error	VTOC
4124	Drive not ready	VTOC
4126	Program error (Divide)	VTOC
4128	Program error (Bad Data)	VTOC
412A	FDX1 ID does not match	VTOC
412B	FDX2 ID does not match	VTOC
412C	FDR1 ID does not match	VTOC
4131	Media error	Self Test Monitor (@NORMAL in @DIAGST@)
4132	Controller H/W error	Self Test Monitor
4133	Checksum does not match	Self Test Monitor
4134	Drive not ready	Self Test Monitor
4136	Program error (Divide)	Self Test Monitor
4138	Program error (Bad Data)	Self Test Monitor
413A	Library not found	Self Test Monitor
413B	File not found	Self Test Monitor
413C	FDR1 not found	Self Test Monitor
413E	Extents greater than 3	Self Test Monitor
4141	Media error	Diagnostic Monitor (@MONITOR in @DIAGMN@)
4142	Controller H/W error	Diagnostic Monitor
4143	Checksum does not match	Diagnostic Monitor
4144	Drive not ready	Diagnostic Monitor
4146	Program error (Divide)	Diagnostic Monitor
4148	Program error (Bad Data)	Diagnostic Monitor
414A	Library not found	Diagnostic Monitor
414B	File not found	Diagnostic Monitor
414C	FDR1 not found	Diagnostic Monitor
414E	Extents greater than 3	Diagnostic Monitor

Test / EC #	Test Title / Error Code Description	
41	BOOTSTRAP LOADER	
4151	Media error	System Loader (@IPL25@@ IN @SYSTEM@)
4152	Controller H/W error	System Loader
4153	Checksum does not match	System Loader
4154	Drive not ready	System Loader
4156	Program error (Divide)	System Loader
4158	Program error (Bad Data)	System Loader
415A	Library not found	System Loader
415B	File not found	System Loader
415C	FDR1 not found	System Loader
415E	Extents greater than 3	System Loader
41F3	Invalid H/W configuration	
41F4	Floppy Status error	
41FD	Bus Processor Code RAM parity error	
41FE	Bus Processor Data RAM parity error	
41FF	Unknown interrupt on the Bus Processor	
42	SELF TEST MONITOR	
4210	Unlabeled volume (VOL1 Missing)	Volume Label
4211	Media error	Volume Label
4212	Controller H/W error	Volume Label
4214	Drive not ready	Volume Label
4216	Program error (Divide)	Volume Label
4218	Program error (Bad Data)	Volume Label
4219	Media error	Bit Map
421A	Controller H/W error	Bit Map
421C	Drive not ready	Bit Map
421E	Program error (Divide)	Bit Map
4220	Program error (Bad Data)	Bit Map
4221	Media error	VTOC
4222	Controller H/W error	VTOC
4224	Drive not ready	VTOC
4226	Program error (Divide)	VTOC
4228	Program error (Bad Data)	VTOC
422A	FDX1 ID does not match	VTOC
422B	FDX2 ID does not match	VTOC
422C	FDR1 ID does not match	VTOC

Test / EC #	Test Title / Error Code Description	
42	SELF TEST MONITOR	
4231	Media error	Workstation File (@SLFWS0 in @DIAGST@)
4232	Controller H/W error	Workstation File
4233	Checksum does not match	Workstation File
4234	Drive not ready	Workstation File
4236	Program error (Divide)	Workstation File
4238	Program error (Bad Data)	Workstation File
423A	Library not found	Workstation File
423B	File not found	Workstation File
423C	FDR1 not found	Workstation File
423E	Extents greater than 3	Workstation File
4241	Media error	ISIO File
4242	Controller H/W error	ISIO File
4243	Checksum does not match	ISIO File
4244	Drive not ready	ISIO File
4246	Program error (Divide)	ISIO File
4248	Program error (Bad Data)	ISIO File
424A	Library not found	ISIO File
424B	File not found	ISIO File
424C	FDR1 not found	ISIO File
424E	Extents greater than 3	ISIO File
4251	Media error	DE File
4252	Controller H/W error	DE File
4253	Checksum does not match	DE File
4254	Drive not ready	DE File
4256	Program error (Divide)	DE File
4258	Program error (Bad Data)	DE File
425A	Library not found	DE File
425B	File not found	DE File
425C	FDR1 not found	DE File
425E	Extents greater than 3	DE File
4261	Media error	@BT0500@ in @DIAGST@
4262	Controller H/W error	@BT0500@ in @DIAGST@
4263	Controller H/W error	@BT0500@ in @DIAGST@
4264	Drive not ready	@BT0500@ in @DIAGST@
4266	Program error (Divide)	@BT0500@ in @DIAGST@
4268	Program error (Bad Data)	@BT0500@ in @DIAGST@
426A	Library not found	@BT0500@ in @DIAGST@
426B	File not found	@BT0500@ in @DIAGST@
426C	FDR1 not found	@BT0500@ in @DIAGST@
426E	Extents greater than 3	@BT0500@ in @DIAGST@

Test / EC #	Test Title / Error Code Description	
42	SELF TEST MONITOR	
4271	Media error	@CT0500@ in @DIAGST@
4272	Controller H/W error	@CT0500@ in @DIAGST@
4273	Controller H/W error	@CT0500@ in @DIAGST@
4274	Drive not ready	@CT0500@ in @DIAGST@
4276	Program error (Divide)	@CT0500@ in @DIAGST@
4278	Program error (Bad Data)	@CT0500@ in @DIAGST@
427A	Library not found	@CT0500@ in @DIAGST@
427B	File not found	@CT0500@ in @DIAGST@
427C	FDR1 not found	@CT0500@ in @DIAGST@
427E	Extents greater than 3	@CT0500@ in @DIAGST@
4281	Media error	@CT0800@ in @DIAGST@
4282	Controller H/W error	@CT0800@ in @DIAGST@
4283	Controller H/W error	@CT0800@ in @DIAGST@
4284	Drive not ready	@CT0800@ in @DIAGST@
4286	Program error (Divide)	@CT0800@ in @DIAGST@
4288	Program error (Bad Data)	@CT0800@ in @DIAGST@
428A	Library not found	@CT0800@ in @DIAGST@
428B	File not found	@CT0800@ in @DIAGST@
428C	FDR1 not found	@CT0800@ in @DIAGST@
428E	Extents greater than 3	@CT0800@ in @DIAGST@
4291	Media error	@CT0B00@ in @DIAGST@
4292	Controller H/W error	@CT0B00@ in @DIAGST@
4293	Controller H/W error	@CT0B00@ in @DIAGST@
4294	Drive not ready	@CT0B00@ in @DIAGST@
4296	Program error (Divide)	@CT0B00@ in @DIAGST@
4298	Program error (Bad Data)	@CT0B00@ in @DIAGST@
429A	Library not found	@CT0B00@ in @DIAGST@
429B	File not found	@CT0B00@ in @DIAGST@
429C	FDR1 not found	@CT0B00@ in @DIAGST@
429E	Extents greater than 3	@CT0B00@ in @DIAGST@
42A1	Media error	@MT0500@ in @DIAGST@
42A2	Controller H/W error	@MT0500@ in @DIAGST@
42A3	Controller H/W error	@MT0500@ in @DIAGST@
42A4	Drive not ready	@MT0500@ in @DIAGST@
42A6	Program error (Divide)	@MT0500@ in @DIAGST@
42A8	Program error (Bad Data)	@MT0500@ in @DIAGST@
42AA	Library not found	@MT0500@ in @DIAGST@
42AB	File not found	@MT0500@ in @DIAGST@
42AC	FDR1 not found	@MT0500@ in @DIAGST@
42AE	Extents greater than 3	@MT0500@ in @DIAGST@

Test / EC #	Test Title / Error Code Description		
42	SELF TEST MONITOR		
42B1	Media error		
42B2	Controller H/W error		
42B3	Controller H/W error		
42B4	Drive not ready		
42B6	Program error (Divide)		
42B8	Program error (Bad Data)		
42BA	Library not found		
42BB	File not found		
42BC	FDR1 not found		
42BE	Extents greater than 3		
42E0	SIO timeout		
42E1	SIO overrun		
42E2	SIO data RAM parity error		
42E3	SIO serial parity error		
42E4	ISIO timeout		
42E5	ISIO memory parity		
42E6	ISIO data RAM parity error		
42E7	ISIO Power Up failed		
42E8	ISIO Data link timeout		
42E9	ISIO FIFO parity		
42EA	Workstation powered off		
42EB	Workstation coaxial parity error		
42EC	Workstation memory parity error		
42ED	Workstation has no code		
42EE	Workstation status invalid		
42F3	Invalid H/W configuration		
42F4	Floppy status error		
42F5	No terminal ID byte found		
43	SELF TEST MONITOR		
4351	Media error	@ST0500@	in @DIAGST@
4352	Controller H/W error	@ST0500@	in @DIAGST@
4353	Controller H/W error	@ST0500@	in @DIAGST@
4354	Drive not ready	@ST0500@	in @DIAGST@
4356	Program error (Divide)	@ST0500@	in @DIAGST@
4358	Program error (Bad Data)	@ST0500@	in @DIAGST@
435A	Library not found	@ST0500@	in @DIAGST@
435B	File not found	@ST0500@	in @DIAGST@
435C	FDR1 not found	@ST0500@	in @DIAGST@
435E	Extents greater than 3	@ST0500@	in @DIAGST@

Test / EC #	Test Title / Error Code Description	
4361	Media error	@ST0800@ in @DIAGST@
4362	Controller H/W error	@ST0800@ in @DIAGST@
4363	Controller H/W error	@ST0800@ in @DIAGST@
4364	Drive not ready	@ST0800@ in @DIAGST@
4366	Program error (divide)	@ST0800@ in @DIAGST@
4368	Program error (bad data)	@ST0800@ in @DIAGST@
436A	Library not found	@ST0800@ in @DIAGST@
436B	File not found	@ST0800@ in @DIAGST@
436C	FDR1 not found	@ST0800@ in @DIAGST@
436E	Extents greater than 3	@ST0800@ in @DIAGST@
4371	Media error	Overlay @ST0B00@ in @DIAGST@
4372	Controller H/W error	Overlay @ST0B00@ in @DIAGST@
4373	Controller H/W error	Overlay @ST0B00@ in @DIAGST@
4374	Drive not ready	Overlay @ST0B00@ in @DIAGST@
4376	Program error (Divide)	Overlay @ST0B00@ in @DIAGST@
4378	Program error (Bad Data)	Overlay @ST0B00@ in @DIAGST@
437A	Library not found	Overlay @ST0B00@ in @DIAGST@
437B	File not found	Overlay @ST0B00@ in @DIAGST@
437C	FDR1 not found	Overlay @ST0B00@ in @DIAGST@
437E	Extents greater than 3	Overlay @ST0B00@ in @DIAGST@
4381	Media error	Overlay @CM0800@ in @DIAGST@
4382	Controller H/W error	Overlay @CM0800@ in @DIAGST@
4383	Controller H/W error	Overlay @CM0800@ in @DIAGST@
4384	Drive not ready	Overlay @CM0800@ in @DIAGST@
4386	Program error (Divide)	Overlay @CM0800@ in @DIAGST@
4388	Program error (Bad Data)	Overlay @CM0800@ in @DIAGST@
438A	Library not found	Overlay @CM0800@ in @DIAGST@
438B	File not found	Overlay @CM0800@ in @DIAGST@
438C	FDR1 not found	Overlay @CM0800@ in @DIAGST@
438E	Extents greater than 3	Overlay @CM0800@ in @DIAGST@
4391	Media error	Overlay @CM0B00@ in @DIAGST@
4392	Controller H/W error	Overlay @CM0B00@ in @DIAGST@
4393	Controller H/W error	Overlay @CM0B00@ in @DIAGST@
4394	Drive not ready	Overlay @CM0B00@ in @DIAGST@
4396	Program error (Divide)	Overlay @CM0B00@ in @DIAGST@
4398	Program error (Bad Data)	Overlay @CM0B00@ in @DIAGST@
439A	Library not found	Overlay @CM0B00@ in @DIAGST@
439B	File not found	Overlay @CM0B00@ in @DIAGST@
439C	FDR1 not found	Overlay @CM0B00@ in @DIAGST@
439E	Extents greater than 3	Overlay @CM0B00@ in @DIAGST@
43A1	Media error	Overlay @MM0500@ in @DIAGST@
43A2	Controller H/W error	Overlay @MM0500@ in @DIAGST@
43A3	Controller H/W error	Overlay @MM0500@ in @DIAGST@
43A4	Drive not ready	Overlay @MM0500@ in @DIAGST@
43A6	Program error (Divide)	Overlay @MM0500@ in @DIAGST@
43A8	Program error (Bad Data)	Overlay @MM0500@ in @DIAGST@

Test / EC #	Test Title / Error Code Description	
43AA	Library not found	Overlay @MM0500@ in @DIAGST@
43AB	File not found	Overlay @MM0500@ in @DIAGST@
43AC	FDR1 not found	Overlay @MM0500@ in @DIAGST@
43AE	Extents greater than 3	Overlay @MM0500@ in @DIAGST@
44	SYSTEM LOADER	
4410	Unlabeled volume (VOL1 Missing)	Volume Label
4411	Media error	Volume Label
4412	Controller H/W error	Volume Label
4414	Drive not ready	Volume Label
4416	Programming error (Divide)	Volume Label
4418	Program error (Bad Data)	Volume Label
4419	Media error	Bit Map
441A	Controller H/W error	Bit Map
441C	Drive not ready	Bit Map
441E	Program error (Divide)	Bit Map
4420	Program error (Bad Data)	Bit Map
4421	Media error	VTOC
4422	Controller H/W error	VTOC
4424	Drive not ready	VTOC
4426	Program error (Divide)	VTOC
4428	Program error (Bad Data)	VTOC
442A	FDX1 ID does not match	VTOC
442B	FDX2 ID does not match	VTOC
442C	FDR1 ID does not match	VTOC
4431	Media error	Workstation File
4432	Controller H/W error	Workstation File
4433	Checksum does not match	Workstation File
4434	Drive not ready	Workstation File
4436	Program error (Divide)	Workstation File
4438	Program error (Bad Data)	Workstation File
443A	Library not found	Workstation File
443B	File not found	Workstation File
443C	FDR1 not found	Workstation File
443E	Extents greater than 3	Workstation File
4441	Media error	BP Operational Microcode
4442	Controller H/W error	BP Operational Microcode
4443	Controller H/W error	BP Operational Microcode
4444	Drive not ready	BP Operational Microcode
4446	Program error (Divide)	BP Operational Microcode
4448	Program error (Bad Data)	BP Operational Microcode
444A	Library not found	BP Operational Microcode
444B	File not found	BP Operational Microcode
444C	FDR1 not found	BP Operational Microcode
444E	Extents greater than 3	BP Operational Microcode

Test / EC #	Test Title / Error Code Description	
44	SYSTEM LOADER	
4451	Media error	Control Mode File
4452	Controller H/W error	Control Mode File
4453	Controller H/W error	Control Mode File
4454	Drive not ready	Control Mode File
4456	Program error (Divide)	Control Mode File
4458	Program error (Bad Data)	Control Mode File
445A	Library not found	Control Mode File
445B	File not found	Control Mode File
445C	FDR1 not found	Control Mode File
445E	Extents greater than 3	Control Mode File
4461	Media error	CP Microcode File
4462	Controller H/W error	CP Microcode File
4463	Controller H/W error	CP Microcode File
4464	Drive not ready	CP Microcode File
4466	Program error (Divide)	CP Microcode File
4468	Program error (Bad Data)	CP Microcode File
446A	Library not found	CP Microcode File
446B	File not found	CP Microcode File
446C	FDR1 not found	CP Microcode File
446E	Extents greater than 3	CP Microcode File
44E0	SIO time out	
44E1	SIO overrun	
44E2	SIO Data RAM parity error	
44E3	SIO serial parity error	
44E4	ISIO time out	
44E5	ISIO memory parity	
44E6	ISIO data RAM parity error	
44E7	ISIO power up failed	
44E8	ISIO data link timeout	
44E9	ISIO FIFO parity	
44EA	Workstation powered off	
44EB	Workstation coaxial parity error	
44EC	Workstation memory parity error	
44ED	Workstation has no code	
44EE	Workstation status invalid	
44EF	Invalid burnin table	
44F0	DMA timeout	
44F1	DMA failure	
44F2	CPU failure	
44F3	Invalid H/W configuration	
44F4	Floppy status error	

Test / EC #	Test Title / Error Code Description	
45	DIAGNOSTIC MONITOR	
4500	Monitor attempting to run remotely	
4505	Monitor Message Buffer overflow	
4510	Unlabeled volume (VOL1 Missing)	Volume Label
4511	Media error	Volume Label
4512	Controller H/W error	Volume Label
4514	Drive not ready	Volume Label
4416	Programming error (Divide)	Volume Label
4518	Program error (Bad Data)	Volume Label
4519	Media error	Bit Map
451A	Controller H/W error	Bit Map
451C	Drive not ready	Bit Map
451E	Program error (Divide)	Bit Map
4520	Program error (Bad Data)	Bit Map
4521	Media error	VTOC
4522	Controller H/W error	VTOC
4524	Drive not ready	VTOC
4526	Program error (Divide)	VTOC
4528	Program error (Bad Data)	VTOC
452A	FDX1 ID does not match	VTOC
452B	FDX2 ID does not match	VTOC
452C	FDR1 ID does not match	VTOC
4531	Media error	Workstation File
4532	Controller H/W error	Workstation File
4533	Checksum does not match	Workstation File
4534	Drive not ready	Workstation File
4536	Program error (Divide)	Workstation File
4538	Program error (Bad Data)	Workstation File
453A	Library not found	Workstation File
453B	File not found	Workstation File
453C	FDR1 not found	Workstation File
453E	Extents greater than 3	Workstation File
4541	Media error	Test Table File
4542	Controller H/W error	Test Table File
4543	Checksum does not match	Test Table File
4544	Drive not ready	Test Table File
4546	Program error (Divide)	Test Table File
4548	Program error (Bad Data)	Test Table File
454A	Library not found	Test Table File
454B	File not found	Test Table File
454C	FDR1 not found	Test Table File
454E	Extents greater than 3	Test Table File

Test / EC #	Test Title / Error Code Description	
45	DIAGNOSTIC MONITOR	
45E0	SIO timeout	
45E1	SIO overrun	
45E2	SIO data RAM parity error	
45E3	SIO serial parity error	
45E4	ISIO timeout	
45E5	ISIO memory parity	
45E6	ISIO data RAM parity error	
45E7	ISIO power up failed	
45E8	ISIO data link time out	
45E9	ISIO FIFO parity	
45EA	Workstation powered off	
45EB	Workstation coaxial parity error	
45EC	Workstation memory parity error	
45ED	Workstation has no code	
45EE	Workstation status invalid	
45EF	Invalid burnin table	
45F3	Invalid H/W configuration	
45F4	Floppy status error	
45F5	No terminal ID byte found	
45FA	Lost data set ready	
45FB	Transmit data error	
45FC	Receive data error	
46	DIAGNOSTIC MONITOR	
46X1	Media error	Test File X
46X2	Controller H/W error	Test File X
46X3	Controller H/W error	Test File X
46X4	Drive not ready	Test File X
46X6	Program error (Divide)	Test File X
46X8	Program error (Bad Data)	Test File X
46XA	Library not found	Test File X
46XB	File not found	Test File X
46XC	FDR1 not found	Test File X
46XE	Extents greater than 3	Test File X
47	DIAGNOSTIC MONITOR	
47X1	Media error	File X + 15
47X2	Controller H/W error	File X + 15
47X3	Controller H/W error	File X + 15
47X4	Drive not ready	File X + 15
47X6	Program error (Divide)	File X + 15
47X8	Program error (Bad Data)	File X + 15
47XA	Library not found	File X + 15
47XB	File not found	File X + 15
47XC	FDR1 not found	File X + 15
47XE	Extents greater than 3	File X + 15

Test / EC #	Test Title / Error Code Description	
48	DIAGNOSTIC MONITOR OVERLAY FILES	
48X1	Media error	Overlay X
48X2	Controller H/W error	Overlay X
48X3	Controller H/W error	Overlay X
48X4	Drive not ready	Overlay X
48X6	Program error (Divide)	Overlay X
48X8	Program error (Bad Data)	Overlay X
48XA	Library not found	Overlay X
48XB	File not found	Overlay X
48XC	FDR1 not found	Overlay X
48XE	Extents greater than 3	Overlay X
49	DIAGNOSTIC MONITOR OVERLAY FILES	
49X1	Media error	Overlay X + 15
49X2	Controller H/W error	Overlay X + 15
49X3	Controller H/W error	Overlay X + 15
49X4	Drive not ready	Overlay X + 15
49X6	Program error (Divide)	Overlay X + 15
49X8	Program error (Bad Data)	Overlay X + 15
49XA	Library not found	Overlay X + 15
49XB	File not found	Overlay X + 15
49XC	FDR1 not found	Overlay X + 15
49XE	Extents greater than 3	Overlay X + 15

Test / EC #	Test Title / Error Code Description
4B	CPU MEMORY SELF TEST
4B01	CPU Instruction Counter cannot be set to zero.
4B02	Data error on write/read of control memory.
4B03	Data error on read/write/read sequence of control memory.
4B04	CPU hardware status register error. Bit 2 not reset after setting CPU into STEP mode.
4B05	CPU hardware status register error. Bit 2 not set after setting CPU into RUN mode.
4B06	CPU hardware status register error. Bit 2 not reset after setting CPU into STEP mode from RUN mode.
4B07	CPU hardware status register error. Bit 3 not reset after disabling CPU address comparator.
4B08	CPU hardware status register error. Bit 3 not set after enabling CPU address comparator.
4B09	CPU hardware status register error. Bit 4 not set after enabling CPU address comparator and setting compare address equal to MIC.
4B0A	CPU hardware status register error. Bit 4 not reset after enabling CPU address comparator and setting compare address not equal to MIC.
4B0B	CPU hardware status register error. Bit 3, 4, or 5 not reset after disabling CPU address comparator.
4B0C	CPU hardware status register error. Bit 3, 4, or 5 not reset after disabling CPU address comparator, with compare address set equal to MIC.

Test / EC #	Test Title / Error Code Description
4B	CPU MEMORY SELF TEST
4B0D	CPU hardware status register error. Bit 3 or 4 not set after enabling CPU address comparator, with compare address set equal to MIC.
4B0E	Sync interrupt not detected.
4B0F	CPU hardware status register error. Bit 3 or 4 not reset after disabling CPU address comparator, with compare address set equal to MIC.
4B10	CPU hardware status register error. CPU CIO 7 status bit set after execution of a NOP instruction.
4B11	CPU HALTED interrupt not detected on a step in STEP mode.
4B12	CPU hardware status register error. CPU CIO 7 status bit not set after execution of a CIO 7 instruction.
4B13	CPU HALTED interrupt not detected when a CIO 7 instruction executed.
4B14	CPU hardware status register error. CPU CIO 7 status bit not reset after execution of a NOP instruction.
4B15	CPU HALTED interrupt not detected when a NOP instruction executed.
4B16	CPU SYNC interrupt not detected.
4B17	CPU hardware status register error. Bit 7 not set or bit 3 not reset after setting NANO STEP mode.
4B18	Incorrect MIC after executing ENABLE IO3.
4B19	Incorrect MIC after executing CLEAR IO3.
4B1A	CPU IO3 status bit not cleared by CLEAR IO3 instruction.
4B1B	BP IO3 status bit not set by CLEAR IO3 instruction.
4B1C	Incorrect MIC after executing CLEAR IO4 instruction.
4B1D	CPU IO4 bit not cleared by CLEAR IO4 instruction.
4B1E	Incorrect MIC after executing CLEAR IO4b instruction.
4B1F	BP IO4b status bit not set after executing CLEAR IO4b instruction.
4B20	Incorrect MIC after executing MOVE IO4b to IO4.
4B21	CPU IO4 status bit not clear after moving IO4b to IO4.
4B22	Incorrect MIC after executing MOVE IO4b to IO4.
4B23	BP IO3 status bit not reset after SET IO3 instruction.
4B24	BP IO4b status bit not reset after SET IO4b instruction.
4B25	CPU IO4 not set after SET IO4b, and MOVE IO4b TO IO4 instructions executed.
4B26	CPU IO3 status bit not set after SET IO3 instruction executed.
4B27	Incorrect MIC after CLEAR IO3 instruction executed.
4B28	CPU IO3 status bit not reset after CLEAR IO3 instruction executed.

Test / EC #	Test Title / Error Code Description
4B29	BP IO3 status bit not set after executing CLEAR IO3 instruction.
4B	CPU MEMORY SELF TEST
4B2A	IO3 interrupt not detected when IO3 cleared.
4B2B	Incorrect MIC after executing CLEAR IO4b instruction.
4B2C	BP IO4b status bit not set after executing CLEAR IO4b instruction.
4B2D	IO4b interrupt not detected when IO4b cleared.
4B2E	Incorrect MIC after executing CLEAR IO4b instruction
4B2F	CPU IO4 status bit cleared after executing CLEAR IO4b instruction.
4B30	Incorrect MIC after executing DISABLE IO3.
4B31	CPU IO3 status bit not clear when setting IO3 after disabling IO3.
4B32	Incorrect MIC after executing ENABLE IO3.
4B33	CPU IO3 bit not set after enabling IO3.
4B34	CPU NANO code error.
4C	CPU OPERATIONAL SELF TEST
4C10	Time out
4C20	CPU detected error
4C30	CPU parity error
4D	CPU INTEGRITY SELF TEST
4D10	Time out
4D20	CPU detected error
4D30	CPU parity error
4E	MAIN MEMORY SELF TEST
4E10	Time out
4E20	CPU detected Main Memory error
4E30	CPU parity error
4F	BP DMA SELF TEST
4F01	Continuous MM error correction count interrupt
4F02	Continuous BP/MM DMA interrupt
4F03	Continuous CP sync interrupt
4F11	DRAM MAR data compare failure
4F21	DRAM MAR changed after diagnostic ripple with ripple controls = 0.
4F22	DRAM MAR incorrect value after diagnostic ripple, controls = 1.
4F23	DRAM MAR incorrect value after diagnostic ripple, controls = 2.
4F31	MM MAR low data compare failure
4F32	MM MAR high data compare failure

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Test / EC #	Test Title / Error Code Description
4F41	MM MAR low incorrect value after diagnostic ripple
4F42	MM MAR high incorrect value after diagnostic ripple
4F	BP CMA SELF TEST
4F81	No DMA COMPLETION interrupt on transfer from DRAM to MM
4F82	No DMA COMPLETION interrupt on transfer from MM to DRAM
4F83	No data transferred on DMA from MM
4F84	DRAM addressing failure
4F91	No DMA COMPLETION interrupt on transfer from DRAM to MM
4F92	No DMA COMPLETION interrupt on transfer from MM to DRAM
4F93	Data bus failure received data not equal to expected data.
4F94	BP DMA error status bits set on transfer from DRAM to MM.
4F95	BP DMA error status bits set on transfer from MM to DRAM.
4FA1	No DMA COMPLETION interrupt on transfer from DRAM to MM
4FA2	BP DMA error status bits set on transfer from DRAM to MM.
4FA3	No DMA COMPLETION interrupt on transfer from MM to DRAM
4FA4	BP DMA error status bits set on transfer from DRAM to MM.
4FA5	Data received from MM did not match expected data
4FA6	No DMA COMPLETION interrupt on transfer from DRAM to MM
4FA7	BP DMA error status bits set on transfer from DRAM to MM.
4FA8	MMIMA status bit set on access to valid MM location
4FA9	DRAM data altered on MMIMA fault
4FAA	No DMA COMPLETION interrupt on transfer from DRAM to MM
4FAB	BP DMA error status bits set on transfer from DRAM to MM.
4FAC	MM addressing failure
4FAD	MM addressing failure
4FAE	DRAM data altered by DMA to MM test location
4FAF	Access to MM address greater than size set by CP sizing
4FD8	No DMA COMPLETION interrupt on multiword transfer from DRAM to MM, MAR ripple = 1.
4FD9	DMA count register fault
4FE1	Unexpected interrupt from MM ECC logging counter after initial programming.
4FE2	No DMA complete interrupt on transfer from DRAM to MM
4FE3	BP DMA error status bits set on transfer from DRAM to MM.
4FE4	Unexpected interrupt from ECC logging counter
4FE5	No DMA COMPLETION interrupt on transfer from DRAM to MM
4FE6	BP DMA error status bits set on transfer from DRAM to MM.

Test / EC #	Test Title / Error Code Description
4FE7	Unexpected interrupt from ECC logging counter
4FE8	No DMA COMPLETION interrupt on transfer to DRAM from MM
4FE9	BP DMA error status bits set on transfer to DRAM from MM.
4F	BP DMA SELF TEST
4FEA	Single bit MM error not corrected on 2K DMA transfer
4FEB	Incorrect number of error corrections logged
4FEC	No DMA COMPLETION interrupt on transfer from DRAM to MM
4FED	BP DMA error status bits set on transfer from DRAM to MM.
4FEE	Unexpected interrupt from ECC logging counter
4FEF	No DMA COMPLETION interrupt on attempted 2K word transfer to DRAM from MM with uncorrectable data.
4FF0	BP MMECC status bit not set on read of uncorrectable data.
4FF1	Expected correctable ECC logging interrupt did not occur.
4FF2	DMA operation did not abort on MM noncorrectable ECC error.
FF3	No DMA COMPLETION interrupt on attempted transfer from MM address 100000h to DRAM.
4FF4	BP MMIMA status bit not set after attempted access to MM location 100000h.
4FF5	DMA operation did not abort on MM IMA error
4FF6	No DMA COMPLETION interrupt on attempted 2K word DRAM to MM transfer with bad DRAM parity.
4FF7	BP MMDSB status bit not set after attempted read of DRAM with bad parity.
4FF8	DMA operation did not abort on DRAM parity error
4FF9	No DMA COMPLETION interrupt on DRAM to MM transfer after correcting DRAM parity.
4FFA	BP DMA error status bits set on DRAM to MM transfer after correcting DRAM parity.
4FFB	Unexpected interrupt from ECC logging counter on DRAM to MM transfer after correcting DRAM parity.
4FFC	No DMA COMPLETION interrupt on transfer to DRAM from MM
4FFD	No DMA COMPLETION interrupt on transfer from DRAM to MM
4FFE	BP DMA error status bits set on transfer from DRAM to MM.
60	QUANTUM SELF TEST
A810	No Quantum ID on system
9522	Quantum not ready timeout
6014	Quantum recalibrate seek complete 0 interrupt timeout
6016	Quantum stepper seek complete 0 interrupt timeout
6118	Quantum Track 0 status missing

Test / EC #	Test Title / Error Code Description
62	QUANTUM READ ROUTINE 2 SECTORS
6202	No Quantum ID on system
6204	Quantum Drive 0 not ready
6206	Quantum seek complete 0 interrupt timeout
6208	Quantum programming error, # of blocks too big
62	QUANTUM READ ROUTINE 2 SECTORS
620A	Quantum read COMPLETION interrupt timeout
620C	Quantum DA status error
62D0	Quantum programming error, # of blocks too big
62E0	Quantum attempt error correction interrupt timeout
62E1	Quantum ECC done, status bit missing
62F0	Quantum seek complete 0 interrupt timeout on recalibrate.
62F1	Quantum Track 0 status missing after recalibrate
63	QUANTUM READ ROUTINE 9 SECTORS
6302	No Quantum ID on system
6304	Quantum Drive 0 not ready
6306	Quantum seek complete 0 interrupt timeout
6308	Quantum programming error, # of blocks too big
630A	Quantum read COMPLETION interrupt timeout
630C	Quantum DA status error
630E	Uncorrectable ECC error
63D0	Quantum programming error, # of blocks too big
63E0	Quantum attempt error correction interrupt timeout
63E1	Quantum ECC done, status bit missing
63F0	Quantum seek complete 0 interrupt timeout on recalibrate.
63F1	Quantum Track 0 status missing after recalibrate
70	ISIO DEVICE ADAPTER SELF TEST DIAGNOSTIC
7010	ISIO board ID not found on system
7011	DA READY bit failed to be set, ISIO software status register indicates that the ISIO internal power-up failed.
7012	DA READY bit failed to be set
7013	DA READY bit failed to be reset
7014	DA REQUEST bit failed to be set
7016	DA REQUEST interrupt failed to be detected
7017	Illegal interrupt detected (DA REQUEST interrupt was expected).
7018	DA REQUEST bit failed to be reset
701A	DA REQUEST bit failed to be set
701C	DA READY interrupt failed to be detected
701D	Illegal interrupt detected (DA READY interrupt was expected).
701E	ISIO Software Status Register failed walking ones pattern.

Test / EC #	Test Title / Error Code Description
70	ISIO DEVICE ADAPTER SELF TEST DIAGNOSTIC
7020	LDCBC F/F failed to be reset
7021	LDCBC F/F failed to be set
7022	ISIO failed to internally detect a COMPLETION interrupt
7023	LDCBC F/F failed to be reset
7024	ISIO failed to internally detect LDCBC F/F being reset
7025	SRBC F/F failed to be reset
7026	SRBC F/F failed to be set
7027	DA COMPLETION interrupt failed to be detected
7028	Illegal interrupt detected (DA COMPLETION interrupt was expected).
7029	ISIO failed to internally detect a COMPLETION interrupt
702A	SRBC F/F failed to be reset
702B	ISIO failed to detect SRBC F/F being reset
702C	Loading of LDC BC (with Control Reg. = 0) failed to reset. LDCBC F/F
702D	Loading of SRBC (with Control Reg. = SRDR) failed to prevent SRBC F/F from resetting.
702E	Loading of SRBC (with Control Reg. = 0) failed to reset SRBC F/F.
702F	ISIO failed to set up for DMA operations
703C	ISIO failed to select SR Bank 1
7042	DR to SR Bank 1 DMA: COMPLETION interrupt failed to be detected.
7044	DR to SR Bank 1 DMA: READY interrupt failed to be detected.
7046	DR to SR Bank 1 DMA: REQUEST interrupt failed to be detected.
7048	DR to SR Bank 1 DMA: Hardware status bits failed
704A	DR to SR Bank 1 DMA: Software status bits failed
7052	DR to Z80 and SR 1 to MM concurrent DMAs: COMPLETION interrupt failed to be detected.
7058	DR to Z80 and SR 1 to MM concurrent DMAs: Hardware status bits failed.
705A	DR to Z80 and SR 1 to MM concurrent DMAs: Software status bits failed.
705E	DR to Z80 and SR 1 to MM concurrent DMAs: Interrupts failed (expected 1 COMPLETION, 2 READY, and 2 REQUEST).
706C	ISIO failed to select SR Bank 2
7072	Z80 to DR and MM to SR 2 concurrent DMAs: COMPLETION interrupt failed to be detected.
7078	Z80 to DR and MM to SR 2 concurrent DMAs: Hardware status bits failed.

Test / EC #	Test Title / Error Code Description
70	ISIO DEVICE ADAPTER SELF TEST DIAGNOSTIC
707A	Z80 to DR and MM to SR 2 concurrent DMAs: Software status bits failed.
707E	Z80 to DR and MM to SR 2 concurrent DMAs: Interrupts failed (expected 1 COMPLETION, 2 READY and 2 REQUEST)
7082	SR Bank 2 to DR DMA: COMPLETION interrupt failed to be detected.
7084	SR Bank 2 to DR DMA: READY interrupt failed to be detected.
7086	SR Bank 2 to DR DMA: REQUEST interrupt failed to be detected.
7088	SR Bank 2 to DR DMA: Hardware status bits failed
708A	SR Bank 2 to DR DMA: Software status bits failed
7090	Data transfer failure
70B0	Failure to enable Microcode loading step 1
70B2	Failure to enable Microcode loading step 2
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7201	Write Byte COMPLETION interrupt failure
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7301	Write 256 COMPLETION interrupt failure
7302	Read 256 COMPLETION interrupt failure
7303	Read and test data
7304	SIO status test
7305	SMAR ripple failure
76	SIO GIVE STATUS
7601	Give Status COMPLETION interrupt failure
7602	Status unchanged
7603	Valid status
7604	Valid device type
90	SIO GIVE STATUS
9011	Workstation Powered Off status
9015	Coax parity, parity error or not running status

Test / EC #	Test Title / Error Code Description
A4	SIO ID TEST
A401	Device ID not found
A4	SIO SMAR TEST
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A810	No Quantum ID on system
B0	SMD, CMD, AND FMD DEVICE ADAPTER
B004	READY status bit failed to set
B012	SMD DA not found on the system
B014	SMD DA port specified does not exist
B016	SMD DA at an illegal address (0400H, 0500H, or 0600H)
B022	SMD DA could not be properly reset
B032	Disk drive could not be selected
B034	Drive "FAULT" could not be cleared
B042	Seek interrupt not detected after a RESTORE (RTZ) operation.
B048	Seek interrupt not detected after a Seek to Track operation.
B0	SMD, CMD, AND FMD DEVICE ADAPTER
B052	ECC error could not be detected
B062	Operation complete interrupt not detected after a Read operation.
B068	Operation complete interrupt not detected after an ECC correction operation.
B082	Drive status error after RESTORE (RTZ) operation
B084	Drive status error after Seek operation
B086	Drive status error after Read operation
B092	Read Sector operation failed (HCE)
B094	Read Sector operation failed
	MISCELLANEOUS
xxFD	Unexpected trap
xxFE	Unexpected SIO interrupt
xxFF	Get control of workstation failure
DEAD	Program trap for execution from nonexistent memory space.

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